

# **Hearth Nutrition Model: Applications in Haiti, Vietnam, and Bangladesh**

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## Abstract

The Hearth nutrition model was introduced in Haiti, Vietnam and Bangladesh in the early 1990s. The model has evolved from earlier community-based approaches to alleviating childhood malnutrition. The focus is on energizing volunteer mothers to rehabilitate malnourished children using local, affordable, nutritious positive-deviant foods for two weeks in the context of a growth monitoring and counseling program. The visible change in the children is a powerful motivator for mothers to continue good feeding practices acquired through adult learning practices (self-discovery, learning by doing) in the Hearth feeding sessions. Hearth programs are meant to be supported by other programs such as deworming, growth monitoring, income generation and micronutrient supplementation.

Findings from recent technical evaluation reports indicate that Hearth can make a significant contribution to the reduction of malnutrition. Results in Haiti indicate that while the short-term rehabilitation of severely and moderately malnourished children under 5 years of age is highly motivating to mothers, the most important long-term impact of the program appears to be the prevention of nutritional deterioration in mildly malnourished children. The results in Vietnam show that the program has improved participating under 3 years of age children's weight-for-age by 0.36 Z-scores on average, and eradicated 82% of all severe and very severe malnutrition in the same group. The solution is rapid, significant and sustainable. Further studies are needed to ascertain whether the program can be replicated in less organized and literate settings. Three-month data from Bangladesh show that the program may have helped to reduce overall malnutrition in the project area from 37.6% to 33.4%.

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# Preface

Hearth programs involve mothers, families and neighborhoods in rehabilitating their own malnourished children, using local food and know-how. Their goal is not only to rehabilitate the participating children, but also to reduce the prevalence of childhood malnutrition in the community and to energize the mothers and community to take broader and sustaining action against malnutrition and poor health. The Hearth programs take place in the context of growth monitoring and counseling and micronutrient supplementation.

In the early 1990s, the Hearth approach was initiated in three different countries. In Bangladesh, the Christian Service Society (CSS) and World Relief Corporation (WRC) are implementing a version of Hearth under a U.S. Agency for International Development (USAID) child survival grant project; in Haiti, Hôpital Albert Schweitzer (HAS) developed and implemented Hearth throughout its service area; and in Vietnam, Save the Children Foundation (SCF) worked closely with the local government to implement Hearth as part of the Poverty Alleviation and Nutrition Program (PANP). All three have recently completed evaluations.

WRC hosted a technical meeting in June 1996 at its headquarters in Wheaton, Illinois, bringing together practitioners and evaluators from these three programs to share and compare their experiences and findings. The participants met for three days to give technical presentations, ask questions, point out similarities and differences among the programs and discuss lessons learned and future plans. The meeting was funded by the Basic Support for Institutionalizing Child Survival (BASICS) Project, USAID's global technical support project for child survival.

This document includes much of the information shared at the meeting. In chapter 1, Warren Berggren and Bart Burkhalter present a historical overview of the development of the Hearth model, followed by a summary of some of the key issues discussed during the meeting. This chapter draws heavily on Dr. Berggren's opening address to the meeting, which noted the gradual movement away from expensive hospital-based solutions and toward inexpensive community-based approaches reliant on parents and volunteers. In chapter 2, Muriel Elmer elucidates certain educational components of the Hearth model that draw upon current behavior change theory and adult learning practices. Bart Burkhalter and Robert Northrup describe in chapter 3 the Hearth program developed at the HAS in Deschapelles, Haiti, by Warren Berggren and his colleagues, and report an evaluation of that program. The surprising results of their evaluation indicate that, while the short-term rehabilitation of severely and moderately malnourished children is highly motivating to mothers, in the long term the most important impact of the program appears to be the prevention of nutritional deterioration in mildly malnourished children.

Gretchen Berggren in chapter 4, and Monique Sternin, Jerry Sternin and David Marsh in chapter 5 report on a Hearth program implemented by SCF as part of the PANP in Vietnam. The results of the evaluation of the Vietnam program are truly remarkable—the virtual elimination of severe and moderate malnutrition in the community, with plans for national implementation. The question is whether this success is reproducible in other less organized and less literate cultures. In chapter 6, Lisa Filoramo describes the implementation of the program by CSS and WRC in Bangladesh and presents preliminary evaluation results. Her paper stresses the practical details required to implement the Hearth program successfully, as well as the pitfalls and lessons learned.

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Finally, the Appendix to this document compares key characteristics of the three applications in the form of a table, which was originally developed during the final session of the meeting. No attempt is made in this document to reproduce the actual discussions that occurred during the meeting or to identify comments by individual participants.

The data presented here indicate that the Hearth model can make a significant contribution to the reduction of malnutrition. There appears to be a growing interest in the Hearth model on the part of nongovernmental organizations (NGOs) and others in the development and nutrition communities. This document should provide the reader with some of the latest information on what Hearth is and how well it has worked so far.

*Arne Bergstrom*

*Bart Burkhalter*

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# Acronyms

AIDS	acquired immunodeficiency syndrome
ARI	acute respiratory infection
BASICS	Basic Support for Institutionalizing Child Survival
CDC	U.S. Centers for Disease Control and Prevention
CDD	Control of Diarrheal Diseases
CERN	Centre d'Education et Rehabilitation Nutritionelle
CHA	community health agent
CHC	commune health center
CHV	community health volunteer
CHW	community health worker
CI	confidence interval
CSC	Commune Steering Committee
CSP	Child Survival Program
CSS	Christian Service Society
EPI	expanded program on immunization
GMC	growth monitoring center
GMP	growth monitoring and promotion
GNP	gross national product
HAS	Hôpital Albert Schweitzer
HIS	health information system
HIV	human immunodeficiency virus
HPNMP	Healthy Pregnancy and New Mother Program
HV	health volunteer
IEC	information, education and communication
IG	income generation
NCHS	National Center for Health Statistics
NDF	Nutrition Demonstration Foyer
NE	nutrition educator
NERP	Nutrition Education and Rehabilitation Program
NGO	nongovernmental organization
NIN	National Institute of Nutrition (Vietnam)
NRLF	Nutrition Revolving Loan Fund
NS	not (statistically) significant
ORT	oral rehydration therapy

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PANP	Poverty Alleviation and Nutrition Program
SCF	Save the Children Foundation
SD	standard deviation
SK	Shishu Kabar
STD	sexually transmitted disease
U5	under 5 years of age
U2	under 2 years of age
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VM	volunteer mother
WAM	weight-for-age as percentage of reference median
WAZ	weight-for-age Z-score
WHO	World Health Organization
WMP	Women's Microenterprise Program
WRC	World Relief Corporation
Z-score	number of standard deviations

# Chapter 1

## Introduction

*Warren L. Berggren and Barton R. Burkhalter*

### Historical Overview

Hearth programs engage parents in rehabilitating their malnourished children at home, using diets based on local knowledge and resources. The programs are designed to take place in the context of a comprehensive nutrition promotion program that includes growth monitoring, micronutrient supplementation, deworming and treatment for infectious diseases. Essentially, the Hearth program arranges for volunteer community mothers to feed malnourished children one nutritious meal each day for two weeks in addition to their normal diet. These feeding sessions are called Hearths because they generally take place in the kitchens of the volunteer mothers. After participating in Hearths, children usually gain weight, presumably because their parents adopt and continue feeding practices learned in the feeding sessions. Children who do not gain weight may have underlying illnesses in addition to malnutrition. Such children are referred to clinics, hospitals or health centers for diagnosis and treatment. When the physician finds no medical impediment to nutritional rehabilitation, parents are again urged to continue the feeding practices they learned in the Hearth program.

The Hearth nutrition model has its historical roots in the Mothercraft Centers, implemented in Haiti and other countries in the 1960s (Berggren et al. 1984; King et al. 1968; 1974; 1978). The Mothercraft Centers, known by the acronym CERN in French for Centre d'Education et Rehabilitation Nutritionelle, used paid nutrition educators to care for and feed moderately and severely malnourished preschool children daily for three months. To the extent possible, the mothers or caretakers of malnourished children were incorporated into the rehabilitation process at the centers so they would learn to prevent future malnutrition in the children. The program used inexpensive local foods as well as a special weaning food to demonstrate that food alone, usually without medicine, would rehabilitate the child. Lessons in hygiene and family planning were given at the center, demonstration vegetable gardens were used and the nutrition educator was expected to follow the child with home visits. While the immediate goal of the Mothercraft Centers was to rehabilitate individual children, the long-range objective focused on eliminating severe childhood malnutrition in the community. Once this was achieved, the successful Mothercraft Center was to be closed and the nutrition educator and equipment transferred to a new community.

Possibly the most dramatic effect of the Mothercraft Centers, at least in the Haitian CERNs, was in the emotional state of the severely malnourished children during their first two weeks of participation in the program. They were transformed from sick and listless to healthy and full of life. These changes were exciting to mothers and elicited their enthusiasm for the CERN's activities. Later changes, such as weight gain, also impressed the mothers, but they often failed to attend the CERN's educational activities after the first month. This was hardly surprising, given the extremely demanding life of rural women in Haiti.

Numerous studies of Mothercraft Center programs in Haiti and elsewhere reported positive impacts in one way or another. King et al. (1968; 1978), Berggren (1971), Beaudry-Darismé (1971) and Beaudry-Darismé and Latham (1973) reported improvements in food selection and preparation practices by mothers, in family diets, in the nutritional status of participating children and in the survival of younger siblings of participating children as a result of the program. Berggren et al. (1985) found that the weights and heights of children participating in the program improved significantly more than countrywide advances.

Various studies subjected Mothercraft Centers to scrutiny. Beaudry-Darismé and Latham (1973) and Berggren et al. (1984) noted that Mothercraft Centers had some serious limitations, including that they (1) were expensive, about \$6,000 per center per year in Haiti in 1980; (2) were slow to reach the entire needy population in a community, especially the poorest; (3) were too dependent on animal protein rather than on local grains and legumes; and (4) became permanent fixtures in the community with the associated problems of absenteeism and dependence. According to anecdotal observation, CERN mothers did not relate well-known signs of malnutrition, such as wasting and edema, to inadequate feeding of the children. Nonparticipating mothers, on the contrary, easily made the connection between improper feeding practices and the development of these signs. One explanation for this may be that the CERN mothers, whose children had been severely malnourished, were reluctant to admit that such a linkage existed. This reluctance may have stemmed from feelings of shame at the CERNs' public disclosure that they had failed to feed their children properly. Eventually, as a result of such limitations, the Mothercraft Center programs lost the support of donors such as USAID.

To address these problems, Berggren et al. (1984) developed a smaller, faster and less expensive approach known as the Nutrition Demonstration Foyer (NDF) in the context of a Haitian growth monitoring and counseling program that included periodic deworming. The new model drastically shortened the period of exposure from three months to two weeks, with lessons taking place daily in a volunteer outdoor kitchen, or "foyer," provided by a family in the community. Here malnourished children gathered daily to partake of nutritious snacks and a supplementary meal prepared with local, calorie-dense foods. Mothers or caretakers assisted a nutrition educator, called a *monitrice*, in preparing and feeding the meals to children, who at first were often anorectic due to their chronic malnutrition. The basic hypothesis was that two weeks was enough time to demonstrate that the malnourished child could be rehabilitated because it is ample time for appetite to return; for the child to begin to smile again, interact positively with the mother and begin to gain weight; and thereby to convince the mother to continue the practices she has learned in the NDF.

The NDF also differed from the Mothercraft Centers in that it borrowed a local kitchen for two weeks instead of creating a new, albeit modest, fixed center in the community. The increased mobility of the *monitrice* permitted her to move across a district and reach more mothers more quickly, leaving most of the follow-up to the local growth monitoring and counseling team. The NDF tried to build on the lessons learned from the Mothercraft Center experience—that mothers learn by doing, that nutritious menus can be created from inexpensive local foods and that ill children should be referred to nearby primary health care centers. The *monitric*es worked in three-week cycles: two weeks to implement an NDF, and one week to set up an NDF in the next

community. With 20 to 25 children per NDF, each monitrice directly reached approximately 340 to 425 children per year.

A follow-up study of the Haitian NDF project found lower death rates in the rehabilitated children from the NDF program than in similarly malnourished children who had merely undergone growth monitoring and counseling (GMC). Further, the NDF project tried to demonstrate that participating mothers who had helped rehabilitate their malnourished children were subsequently better able to prevent deaths in their younger children under the age of 5 (U5) than mothers of malnourished children who had participated in only the GMC program. Although the numbers were small, the follow-up study reported a large and statistically significant difference in the death rates of younger siblings for the two groups in favor of the NDF (Berggren et al. 1980).

Modified versions of the NDF have been introduced into several countries by SCF, and have also reported positive findings of various sorts. In an SCF program in Haiti, Dubuisson et al. (1994) found significant reductions in moderate and severe malnutrition in NDF children relative to controls—the prevalence of moderately and severely underweight children dropped from 77% to 47% in program children after two years compared with a constant 63% in controls. However, this finding may be compromised because potential confounders are not analyzed. In Bangladesh, Kaye et al. (1994) reported significant reduction in the mortality rates in younger siblings of foyer children relative to controls, although this result may be confounded by regression-toward-the-mean.

In 1993, at the same time that Jerry and Monique Sternin were starting their nutritional rehabilitation program in Vietnam and WRC was developing its proposal for Bangladesh, Berggren and colleagues introduced the Hearth program at HAS. These three programs all built on the success of the earlier NDF programs but relied more heavily on input from the communities themselves. At HAS in Haiti, volunteer mothers (*animatrices*) from the communities were trained by monitrices to measure nutritional status, do food recalls, create nutritious meals with food purchased at the local market and carry out the two-week feeding demonstrations in their own homes. Menus, developed in each community by the monitrices and animatrices together, were derived from practices of local mothers with well-nourished children, using principles of positive deviance enunciated by Zeitlin et al. (1990).

The remarkable improvement in the emotional state of the severely malnourished children during the two-week feeding sessions has proven to be a highly motivating experience for the animatrices. The Hearth program at HAS has proven to be feasible and effective. It is relatively low in cost compared to the Mothercraft and NDF programs (about \$7 per participant child), and has allowed HAS to extend the program throughout its service area. The Community Health Unit at HAS built a staff of 14 monitrices, which systematically implemented the program throughout the district served by the hospital.

## Assessment Indicators

The Hearth programs have several short-term and long-term objectives and, accordingly, there are several types of indicators that can be used to measure their success.

### **Increments in Weight-for-Age**

Improvements in the nutritional status of participating children as measured by weight-for-age (Z scores) over a one-year period (or some other appropriate time period) indicate a long-term effect of the program on participants; improvements in weight-for-age status of all children in the community indicate the program's effect in the community beyond the participants.

### **Number of Malnourished Children Presenting at HAS**

This is an indirect indicator of the prevalence of malnutrition in the community and has a direct effect on hospital costs. This was an especially important concern at HAS, because the number of malnourished children presenting at the hospital had increased dramatically in the years just before we started the Hearth program.

### **Mortality among Younger Siblings**

If participant mothers learn from their experience in the Hearths and retain that learning, then the younger siblings of Hearth children should demonstrate lower mortality.

### **Increments in Knowledge, Skills and Attitudes of Mothers/Caretakers**

Such information could provide insights into why the program is working or not working with particular children, mothers and communities, and how to improve it. For example, it would be interesting to learn the role that peer censure and peer support play in changing parental behavior. However, this type of information has not been systematically obtained on the Hearth programs as far as we know.

### **Creation of Well-Functioning and Sustainable Volunteer Community Structures**

The creation of a network of volunteer mothers (or other community structure) that can continue to support families in need and serve as a means for implementing public health programs is a valuable contribution to the community.

### **Issues during Group Discussion**

Discussion among the participants at the Wheaton meeting was spirited, and frequently pulled up the corner of issues not dealt with explicitly during the presentations. Here we summarize the discussion on what we think are some of the more important issues raised by the group. This summary is not intended as a comprehensive recording of all that was said, nor does it capture the pervading enthusiasm and goodwill of the meeting.

### **Significance of Local and National Contexts**

Many local factors can influence the design and success of Hearth programs. While economic and political stability is, of course, a major element in the success of most development programs, Hearth's heavy reliance on local inputs may make it better suited to unstable conditions than other, less community-based, approaches. However, this very fact means that it is more likely to succeed when strong, preexisting community institutions are in place and provide needed support. Certainly, the lack of a collaborative atmosphere would make success difficult. The political stability and strong local institutions in Vietnam doubtless contributed to the great success of that program; in Haiti, although a supportive attitude was apparent in the communities, the general instability and lack of community institutions were major barriers that the HAS Hearth program had to overcome.

The prevailing family structure is another element of the locale that is critical to the functioning of Hearths. Do mothers work in the fields, leaving young children to fend for themselves or in the care of a slightly older sibling? Are fathers present and supportive, authoritarian or generally absent? Are girl children as well cared for as boy children? Such issues influence not only the ability of mothers to participate in and respond to the Hearths, but also the health and nutritional status of the children. Existing disease patterns and the nature of available health services are other important influences (*i.e.*, deworming may be absolutely critical in some situations and less so in others). Although Hearths are concerned with complementary feeding in children generally over 1 year of age, some discussants raised the issue of whether breastfeeding practices at the time of the Hearth or at an earlier age might influence its success.

### **Contribution of Various Components of Hearth**

The Hearth programs include several components within their own structure, such as deworming, initial weighing, feeding, eight-week follow-up and referral to clinics. The programs are often carried out in conjunction with other activities such as growth monitoring and promotion programs (GMP) and microcredit programs for women. It would be valuable to know the relative contribution these different elements make to the success of a Hearth program under different conditions. The evaluation of the HAS program, particularly in view of the program's success in Vietnam, suggests that it is important to operate the Hearths in coordination with a GMP. However, much work remains before we can clearly understand how these different components interact and contribute to program success.

### **Positive Deviance**

Positive deviance is a key concept in all of the Hearths. However, two different definitions are used. Sometimes positive-deviant mothers are defined as mothers from the local community whose children are well-nourished, while in other programs, such as Vietnam, positive-deviant mothers not only have well-nourished children but also come from the lower economic half of the community. In this two-factor definition, a "negative-deviant" mother would come from the upper economic half but have malnourished children. The two-factor definition ensures that the menus given by the positive-deviant mothers are affordable for most of the women in the community.

This is especially important when there is a significant range in the economic conditions of families in a community.

The concept of positive deviance is put to two different uses in the Hearth programs. The first and most prominently heralded use is as a method for discovering affordable and nourishing local foods that mothers can give to their children. In Vietnam the answer was shrimp and other high-protein food from the paddies, essentially free for the taking; in Haiti it was a mixture of beans, vegetables and grains; but in Bangladesh affordable, nourishing menus have proven to be elusive, although not impossible. They have been able to improve the protein and fat contents of the meals—which most commonly include rice, pulses (lentils) and vegetables—by adding ground peanuts to them. The second use of positive deviance is as a communication method to convince mothers of malnourished children that an affordable solution exists. The meals mothers cook and feed to the children are based upon information gathered in their own community from mothers of well-nourished children—these are the positive-deviant mothers. Once discovered, the menu comes out about the same in every community in a region; but the act of discovering the affordable and nourishing menu and its nutritional effectiveness *by themselves* helps to convince the mothers in each community that indeed they can afford to feed this food to their children. This second use, which may be more crucial to the success of Hearth programs than the first use, has not always been recognized.

### Models of Adult Learning

All Hearth programs involve adult learning, but each program approaches it in slightly different ways. The Haiti program stresses self-discovery. Mothers of malnourished children are not told what to do to improve the nutritional status of their children. Instead they are expected to discover it for themselves as a result of the feeding sessions that their children are attending and the very public process by which the animatrices develop a local menu, select children to participate and carry out the feeding. In Vietnam a participatory learning process is used. Establishing habits through repeated practice is one technique of participatory learning used successfully in the Vietnam program, where mothers are required to gather shrimp and other food from the paddies for two weeks as the price of admission to the feeding sessions. This technique is also used in the Bangladesh program, where mothers learn by doing the cooking several times during the two weeks of the feeding sessions. Both of these approaches—self-discovery and participatory—differ from the learning-by-demonstration technique that was used in the Mothercraft Centers.

### Rehabilitation Versus Prevention

The immediate objective of the feeding sessions is to nutritionally rehabilitate severely and moderately underweight children, and this objective seems to be achieved in all the programs. Not only is it being achieved, but this notable transformation in the children is serving as a strong motivating force for the volunteer mothers and probably for the paid educators as well. The idea is that the rehabilitation experience will lead to long-term behavioral changes in the mothers that will keep those children and their siblings from ever becoming severely or moderately

malnourished again; and, thus, will lower the prevalence of severe and moderate malnutrition in the community. Based on the evaluation presented by David Marsh, this appears to be exactly what is happening in the Vietnam Hearth program. However, in Haiti, the result is of a very different kind. Based on the presentation by Bart Burkhalter, the Haiti Hearth program appears to be preventing mildly malnourished children from getting worse rather than achieving long-term rehabilitation of the severely and moderately malnourished children. So far, we do not have explanations for this interesting difference between the two results.

### **Evaluation and Feedback**

Discussions of the evaluation methodologies and need for additional study were interwoven throughout the presentations. Questions raised included: What are appropriate and feasible objectives for the evaluations? How can confounders and other threats to the validity of results be managed? What level of rigor is required and achievable? What kind of formative research can be done to improve the cost-effectiveness of the programs? Ideas for studies abounded. For example, a study of hospital records of the children who were referred to a clinic or hospital after eight weeks because of failure to grow might lead to improved follow-up of those children. Or, a comparative study of the staffing approaches used in Vietnam (many part-time, low-paid educator mothers) and in Haiti (a few full-time, well-paid and well-trained educators in conjunction with many volunteer animatrices) might yield valuable data on how to design Hearth programs. The analysis of the productivity of individual nutrition trainers in the Bangladesh program might well lead to significant program improvements. The Vietnam program demonstrated that the communities themselves can make good use of simple statistics (in the form of colorful pie charts) and can carry out qualitative analysis of the program to improve its effectiveness.

### **Increasing the Coverage (“Going to Scale”)**

Both Vietnam and Haiti have interesting stories about their efforts to scale up. The Vietnam program started in a few places and, after success there, began to increase its geographic scope by helping others to adopt the methodology. Beginning with four communes containing fewer than 40,000 people in one province in 1991, the program had expanded into eight provinces and was reaching a population of about 500,000 by 1996. At the national level, the Vietnamese Ministry of Health and the National Nutrition Institute have called the program a “model” and recommend that it be adopted nationally. To meet the training needs that are being generated by this growth, SCF designed the concept of a “living university” so that the government and other communities could send people to the original communes for experiential training. The pioneer communities have become the teaching centers.

The HAS Hearth program scaled down from the earlier efforts in Haiti to operate Mothercraft Centers and the NDF programs so that it could afford to scale up. The program scaled down in several ways: from permanent Mothercraft Centers serving several communities to the hearths of local mothers serving a few families; from paid staff to volunteer mothers; from foyers with many children to foyers with only a few children; from three months of demonstration feeding to 12 days; and from several demonstration meals a day to one per day. Such scaling down not only

## Hearth Model

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reduced the cost but also made the whole affair more apparent to the local families. The intellectual aspects of problem-solving were also scaled down, in the sense that decision-making was moved closer to the mothers. The positive-deviant approach incorporated local practice and wisdom to convince mothers that they too could have well-nourished children, and the teaching/learning strategy shifted from demonstrations by knowledgeable persons to self-discovery by the mothers in a partially structured environment. By working with and relying on the communities and individuals in these ways, HAS was able to use its own staff to focus on scaling-up issues. It moved aggressively to establish the program throughout the district; it implemented new topics in the fledgling network; and it identified problems and initiated new interventions such as the microcredit program.

# Chapter 2

## Hearth Model's Use of Social Learning Theories and Adult Learning Practices

*Muriel I. Elmer*

### Hearth as a Learning Model

The Hearth program takes an innovative approach to the alleviation of malnutrition in developing countries by training and motivating mothers to rehabilitate their own malnourished children. The implementers of the Hearth nutrition model (which is still in a fledgling stage of development) have built into its structure certain educational components that draw heavily from current behavior change theory and adult learning practices. The nutritional rehabilitation of a malnourished child demands a fundamental shift in the mother's feeding habits. This shift requires far more than a simple rehearsal of known scientific facts related to how that mother should feed her child.

Undoubtedly, facts are essential to effect behavioral change, but facts alone are almost never sufficient. Change requires an understanding of how the mother perceives the facts, how she learns the facts, what skills she can acquire to implement the new information, what barriers must be removed to enable her to practice the new skills and what will help her persevere in that behavior over the longer term.

This chapter examines briefly how the "ideal" Hearth model, as conceived by its originators Gretchen and Warren Berggren, incorporates certain theoretical components to ensure effective learning and positive behavior change. It must be noted, however, that each one of the three applications of the Hearth model presented in this document does not incorporate all of these theoretical components, but one or more components are represented in each application.

### Hearth Program's Community-Based Approach

Hearth program promoters meet with the community as a whole before deciding to implement a program in that community. In the meeting, promoters present growth monitoring and promotion (GMP) data gathered from the community that demonstrate the high levels of malnutrition in the community. They discuss the causes of malnutrition with the people and explain how a Hearth program conducted in their village would help mothers rehabilitate their own malnourished children. Through this participatory process, promoters raise community awareness of the malnutrition problem and garner active support by the community for conducting a Hearth program in the village. One indicator of community support is the identification of volunteer mothers willing to be trained to conduct the Hearth sessions.

### Community Participation Theory

The component of community participation in the Hearth model draws on the work of several theorists. Lewin (1958) demonstrated that people who are involved in group discussion and decision-making processes about an issue are much more likely to change their attitudes and behaviors than those who were simply informed about how their behavior should change. Lewin, Allport (1945), Hochbaum (1960) and Alinsky (1972) all held that change requires an “unfreezing” of currently held perceptions, which can occur when a problem is reexamined from a different perspective and thereby creates some frustration with the status quo.

Such discussions, when broadened to the community level, tend to empower the community as a whole and develop within the community an awareness and a competence for problem-solving. The communities that participate in these discussions can make significant positive changes in health behaviors as has been shown by Minkler (1985), Israel (1985) and Thomas, Israel and Steuart (1985). Much of the above work with communities has been built upon Freire’s (1974) pioneering work among nonliterate peasants in Brazil. Freire’s emphasis on dialogue in problem-solving and mutual respect between facilitators and peasants, along with the importance of reflection and action (praxis) as a means to changing the status quo, have influenced the basic principles that are the foundation of Hearth community meetings.

### Social Learning Theory

Mischel (1973) and Bandura (1978; 1986), two leading social learning theorists, have developed several concepts related to learning, which inform the design of the Hearth model. The concepts have been further refined by other theorists. Bandura developed the concept of *reciprocal determinism*, which describes the relationship among three components—the environment, the person and the behavior—and assumes that behavior results from a constant interplay among these three components. The Hearth model addresses all three components in order to enhance learning.

### Learning Environment

Bandura’s first component in social learning theory is the environment or the situation in which a person behaves. The environment also provides what are known as expectancies or incentives and disincentives for a specific behavior.

Within the Hearth program context, a poor mother living in a particular culture and bound by its exigencies has many disincentives to health behavior change that need to be removed and replaced with incentives if she is to change her behavior. Some of the disincentives to change in feeding behaviors that are addressed by the Hearth program are: (1) lack of support by the community, (2) lack of money to buy nourishing food and (3) lack of peer support. Furthermore, Hearth provides the mother with the incentive of seeing her child, within the first 12 days of the Hearth feeding sessions, transformed from a passive, whining, crying child into an alert, active, playful and happy child. This incentive can provide powerful reinforcement for her new feeding habits.

### Capacities of the Learner

The second component of social learning theory is the person herself or himself in interaction with the environment. According to Bandura and Mischel, the person or learner must have five capacities in order to change her or his behavior. The first is the capacity for action known as *behavioral capability*, or the knowledge and skill to perform a given behavior. The second capacity is the ability to learn from a model who demonstrates the desired behavior, and is called *observational learning* by these theorists. The third capacity is *self-control* whereby a person determines whether or not to act. The fourth capacity is having *expectations* that enable the learner to anticipate the outcomes of her or his actions. This has also been described by Argyle, Furnham and Graham (1981) and by Magnusson (1981). The final capacity is called *self-efficacy*, which is the confidence a person has in the performance of a certain behavior. Repetition of the performance of a single task builds a person's self-efficacy, which in turn affects task persistence, initiation and endurance, thus promoting behavior change. All of these capacities are prerequisites for behavior change.

Hearth programs enhance a mother's capacity to learn by providing her with the behavioral capability (knowledge and skills) to rehabilitate her malnourished child through the experience of buying low-cost foods and cooking nourishing meals for approximately two weeks under the tutelage of the volunteer mother/trainer. During that time she also has the opportunity for observational learning as she watches the trainer and other mothers model the new feeding behaviors. The success of the positive-deviant mothers provides her with the opportunity to observe the rewards enjoyed by them in the form of well-nourished children. She is able to anticipate a positive outcome (positive expectation) as a result of her participation in a Hearth. The daily repetition of positive feeding habits further builds her confidence (self-efficacy) in her ability to rehabilitate her child.

After the two weeks of feeding sessions are completed, the trainer is expected to visit the mother regularly during the subsequent two weeks to encourage her to continue practicing what she has learned. During these visits the trainer also is required to observe any barriers to the mother's newly acquired feeding habits within the home environment that need to be addressed. Encouraged regularly by the trainer to build better feeding habits, the mother's confidence in her own skills grows and in turn becomes an added incentive to persist in the new behaviors. In the final analysis, however, the mother controls whether or not she will see the Hearth experience through to its completion and whether or not she will persevere in her newly acquired behaviors. Careful attention to all of the above variables should strengthen her self-control and help to determine a positive outcome.

### Behavior of the Learner

The third component of social learning theory is behavior. Behavior is influenced one way or another by variables within the environment and/or within the person, as has already been discussed. It is also possible for a particular behavior to influence or change the variables within the environment or the person. For example, a mother who is particularly resistant to changing her

feeding habits could create a strong disincentive within the group (environment) for other mothers.

One of Bandura's (1977) social learning theory constructs that could be further developed within the Hearth design is that of managing emotional arousal. Anxiety tends to limit learning and the capacity to perform. More specifically, Ley and Spelman (1965) have demonstrated that increased anxiety limits a person's ability to listen to health messages. Obviously, the Hearth trainer's ability to treat the mothers with respect and affirm their efforts would create a safe environment for mothers in which they can relax and learn.

It is probable, however, that the mother's cultural ethos and traditional beliefs may conflict with the latest scientific knowledge being presented, heightening her anxiety and acting as a strong disincentive. For example, somebody's grandmother may insist that her new feeding patterns are of no value or, worse, harmful. In collective cultures where the authority of older family members is unquestioned, such a situation will create anxiety and undermine new learning. Mothers must be given some specific coping strategies for dealing with such situations so they can anticipate them and be ready to counteract the anxiety aroused by them. Hearth programs may already be addressing this issue by having the trainers attempt to identify and remove barriers to behavior change. However, contexts and barriers that are emotionally charged should receive special attention and, of course, the training of volunteer mothers should be specific to their culture.

## Adult Learning Principles

The Hearth curriculum has been based on adult learning principles best articulated by Knowles (1980). His andragogical model assumes that the adult learner is increasingly self-directed, brings to the learning situation considerable life experience, tends to be problem-centered (rather than content-centered), learns best by doing and requires a safe, accepting and interactive approach to learning.

In each of its applications, the Hearth curriculum was designed with these adult educational principles in mind. The use of volunteer mothers from the community as trainers helps to ensure that they will be able to more fully understand a mother's reality and build on her experience to keep the Hearth program relevant. The trainers learn to be respectful in their interactions with mothers, to listen nonjudgmentally to mothers' comments that may run counter to scientific principles and then to gently reiterate the Hearth content. They also affirm positive cultural practices that contribute to nutritional status of the child.

The trainers learn to be interactive in their approach, using questions, pictures, cultural metaphors, stories and demonstrations to draw the mothers into discussion and focus on messages that need to be conveyed. However, since adults learn best from experience, most of the training time is built around the activities of marketing, cooking and feeding.

In conclusion, many of the concepts articulated by learning theorists in this chapter need to be tested more thoroughly in diverse cultural settings. As program implementation experience grows, it will be helpful to document the lessons learned within specific cultures, as Filoramo (1997) has

done for Bangladesh. Finally, any attempts to replicate the Hearth model must include careful planning with regard to the curriculum and the learning needs of mothers of malnourished children. A view of the mother primarily as a learner remains key to the success of the Hearth model. Mothers need to learn in ways that can help them internalize the information so completely that it becomes a part of their daily behavior. Mark Twain said it best when he said, “Education isn’t teaching people to know what they don’t know. It is teaching them to behave as they don’t behave.”



# **Chapter 3**

## **Hearth Program at the Hôpital Albert Schweitzer in Haiti**

*Barton R. Burkhalter and Robert S. Northrup*

### Summary

The Hearth program of the Hôpital Albert Schweitzer (HAS) in Haiti is a result of evolutionary modifications of earlier feeding and education programs to combat childhood malnutrition. The involvement of volunteer mothers (*animatrices*) and the location of the feeding at the hearths of these mothers rather than in special centers are the critical differences from earlier approaches.

A group of animatrices (10–20) from a single community are trained and motivated in a week-long educational program held in their own community. They learn about basic principles of child feeding, the growth monitoring program, growth curves, the importance of micronutrient supplementation and then do a 24-hour recall dietary study on a single child from their 15 households who has been growing well (a “positive deviant”). Their trainers (*monitrices*) then combine the one-family information from the animatrices in the group to define a nutritious meal that is clearly available locally and is affordable. The animatrices-in-training prove to themselves and the community the economic feasibility of the diet by purchasing food (with money provided by the program) for such a meal at the local market. Then they practice preparing that meal early the next morning in one of their own kitchens and feeding it to any available local children.

At the end of the training week all the children aged 1 to 5 years from the selected households are weighed as well as dewormed and those with significant malnutrition identified. The mothers of these malnourished children are then convinced to have the children participate in the two-week feeding program beginning the following week.

The two weeks of feeding are sufficient to bring about a dramatic improvement in the appetite, general demeanor and activity level of the participating children. They are transformed before the eyes of the animatrices, mothers and neighbors from listless, apathetic children who do not want to eat to energetic children who seemingly cannot get enough to eat. This change appears to convince the animatrices of the effectiveness of the diet and the importance of their role in working with the children and mothers as motivators and neighborhood leaders, even without pay. It is also believed to influence the mothers to continue giving their children the new diet after the Hearth feedings are completed, and to use the new feeding approach with younger siblings as well. The mothers learn by watching, participating and by talking with the animatrices and perhaps other mothers.

The program follows up with weighings at four and eight weeks after the feedings. Children with no weight gain are referred to the hospital for medical diagnosis and treatment. The animatrices are expected to continue to interact with their 15 mothers after the cycle is over. The monitrices then use monthly meetings to involve animatrices from a particular locality in a broader range of public health activities (such as breastfeeding promotion and AIDS and STD prevention).

were similar, with one exception. The comparison sample participated in a Growth Monitoring and Promotion (GMP) program but not in the Hearth program, while the program sample all participated in the Hearth program but only about one-third participated in the GMP program.

The results showed that the Hearth program prevented deterioration in the nutritional status of mildly underweight children relative to the comparison group, but did worse than the comparison group with respect to severely underweight children. The finding about the mildly underweight children was highly significant ( $p < .01$ ) with the gain over the comparison group being substantial (about 30% of a standard deviation on the reference weight-for-age distribution), while the negative finding about the severely underweight was not statistically significant. This result suggests that a combination of Hearth and GMP may be the most effective solution to the malnutrition problem.

The Hearth program appears to be successful in recruiting community volunteers and motivating them to remain active. It has thus established the cadre of animatrices as a valuable force for reaching the community with other primary health care activities. Other findings are: (1) the use of “positive-deviant” mothers was more important as a psychological device to convince the other mothers that the menu was effective and affordable, than as a strategy for discovering best local foods; (2) the animatrices were selected on the basis of personality and interest; (3) the animatrices themselves decided which families they would work with. This approach tapped into the mobile dynamics of the Haitian countryside and is probably a key factor in program success; (4) surprisingly, the age of the participating children did not correlate with nutritional status or gain in nutritional status over the course of the program.

The cost of the program is relatively small, about \$7 (U.S.) per program participant—about \$3 for food per child (\$.25 per meal), and \$4 per child for other costs (salaries, transportation and documentation).

Several methodological issues threatened the validity of the evaluation’s conclusions, e.g., selection bias and community effect. While the potential effects of these issues remain uncertain, most of the unresolved issues will tend to understate the real effects of the program. Future evaluations should be done prospectively with representative population samples rather than samples of program participants only. Further study is needed of the contribution to program impact made by the individual program components, including deworming, feeding, hospital referral and monitrice and animatrice characteristics and the interactive impact of GMP and Hearth on nutritional status.

## Program Description

In 1993, Berggren and colleagues implemented a new version of the Nutrition Demonstration Foyer (NDF) program at HAS, which they call the Hearth program, “hearth” being the English translation of the French word *foyer*.<sup>1</sup> The Hearth program retains most of the features of the earlier NDF program, but makes some key changes in procedures and goals. For example, the Hearth program enlists volunteer mothers (animatrices) to perform the foyers rather than the

<sup>1</sup> Following the practice of Dr. Berggren, this paper uses the term “Hearth” to refer to the program implemented at HAS since 1993 and its derivatives to clearly distinguish them from the earlier NDF program. The term “foyer” (the French word for hearth) is reserved here to refer to the actual feeding sessions rather than the entire program.

monitrices, uses the hearths of the animatrices as feeding sites rather than borrowing community kitchens as is done in the NDF programs and makes use of a positive-deviant approach. It is important to note that the program has always been conducted in communities where ongoing growth monitoring occurs every two months and where micronutrients are regularly distributed.

The Hearth and NDF programs share short-term as well as some long-term goals. These are: to rehabilitate moderately and severely malnourished children; to train and motivate their mothers to maintain their improved nutritional status; and to lessen the prevalence of malnutrition in the community. Additionally, the Hearth program also hopes to “jump-start” a network of volunteer mothers to help the hospital provide improved primary health care services in the communities.

This analysis dissects the program into its various components, discussing the potential influence of each component on the success of the program in improving the nutrition of the index participants and other children in their families and the community. The discussion focuses on the Hearth program as implemented by Erve Bottex, Mona Cassion-Menager and Warren and Gretchen Berggren in the Artibonite Valley service area of the HAS, consisting of some 200,000 persons.

### **Growth Monitoring and Promotion Program (GMP)**

The HAS GMP, run by the HAS *Agents Communautaires*, called *agents*, weighs children under 5 years of age (U5s) every two months at community gatherings called rally posts. These posts provide an opportunity for immunization, Vitamin A distribution and other public health interventions as well as for weighing and counseling. Even though agents do home visits and “prompt” mothers to come to these growth monitoring sessions, absenteeism is high. This is evidenced in the low attendance figures—only about a third of the eligible children attend the weighings. The cultural environment in the Haitian community may be responsible in part for this low attendance rate. Most Haitian women work in the marketplace or in gardens and, therefore, are often unable to attend rally posts. Compared to other countries such as Indonesia, there is minimal community cohesiveness or solidarity and few ongoing collaborative efforts among households. People “mind their own business” according to one experienced HAS Haitian field supervisor, except for church-related interactions. Hence, encouraging others to attend a communal weighing session may not be a customary type of behavior. Whatever the cause, the low rate of GMP attendance by mothers who participate in the Hearth program makes it hard to believe that the GMP has much influence on the mothers’ awareness of malnutrition, or their knowledge of the principles of a good diet and practical food substitution possibilities to ensure a balanced diet at reasonable cost.

The GMP and Hearth programs can support each other. The GMP provides a mechanism for ongoing follow-up of the children who complete the two-week feeding program. The animatrices may increase attendance in the GMP by persuading mothers in their neighborhood to attend. Before the start of the Hearth program, there were no community workers in the study area other than the agents to perform this role; the cadre of animatrices had not yet been formed. Furthermore, the results of the evaluation reported below suggest the possibility that the GMP

may be more successful in reducing severe malnutrition and the Hearth program may work better on mildly malnourished children.

### **Monitrice Qualifications and Activities**

The monitrice functions as trainer and supervisor for the animatrices. These women have an eighth grade or higher education, and receive initial training for two months with an emphasis on skills in nutrition program activities and the management of the foyers. During the period of intensive hearth program activities, the monitrices spend one week arranging for the five-day training course for animatrices and weighing activities, one week giving the course and the subsequent week monitoring the first week of feeding. During the first week, they help the new animatrices to find their 15 families and to obtain preliminary information about these families.

During the third week (first feeding week), they also provide the funds to the animatrices for the second feeding week, as well as complete data collection and documentation about the households served by each animatrice, including lists of the participating children for each foyer and other reports. This cycle is then repeated for the next area and group of animatrices. During the week of arrangements, they also conduct the four- and eight-week weighings of the children who have completed their foyers. In a typical cycle, time is available, especially during the second feeding week, for the monitrices to conduct monthly meetings with their animatrices, wherein they teach them new preventive initiatives in exclusive breastfeeding, family planning, GMP, Vitamin A distribution and AIDS and STD prevention. This is also a time to hear reports of local activities and problems from the animatrices requiring immediate or future solutions.

A range of skills must be acquired by the monitrices to enable them to conduct the training course and to motivate and lead the group of animatrices during the foyer and afterwards. Skills in training and motivational leadership are needed in addition to skills in various activities related to nutrition, including the ability to calculate the protein and calorie content of a foyer meal. The program leaders comment that much of the success of the HAS foyers is due to the dedication and skill of the monitrices.

### **Training Course for Animatrices**

The training course for animatrices, conducted by one or two monitrices, is critical to the success of the Hearth program. Based on principles of effective adult learning, it stresses learning by discovery as well as by actual practice. This training takes five days.

**Day One.** On the first day the animatrices are informed about the formation and implementation of the foyers, and motivated to make a commitment to being an animatrice. They also learn to interpret a growth curve on a standard growth card and to identify malnourished children on the basis of that curve or a single weight. Finally, they learn to carry out a simple 24-hour recall dietary history that focuses on the types of food rather than the quantity of food consumed. They are assigned to seek out a positive-deviant child who is nutritionally normal or mildly malnourished on the basis of his or her growth card, and then to carry out the simple 24-hour recall dietary survey on that child, for reporting to the group on the following day.

**Day Two.** Each animatrice reports the components of the diet of the positive-deviant child she studied. The monitrice tabulates these reports, noting the frequency that each type of food was included in the positive-deviant diets and reports these frequencies to the group of animatrices in the form of a menu based on the most frequently used foods in these positive-deviant diets. Quantities are taken into account by the monitricas at this point to provide a nutritionally balanced menu. Together the animatrices and monitrice estimate the cost of each item in the marketplace (usually accompanied by expressions of concern by the animatrice that the items are too expensive, and reassurances by the monitrice that each of these food items is in fact being purchased daily by their neighbors).

**Day Three.** Each animatrice is given money to purchase food for two children according to the menu. Meanwhile, one of the Hearth program staff members purchases the same items at the same time in the same market to breed an atmosphere of competition for getting the lowest price. The monitrice weighs the purchased items to estimate their nutritional value in calories and proteins. This leads to the conclusion that a nutritionally complete and full diet can in fact be purchased for the allocated amount of money.

**Day Four:** This is the day for rehearsal. Small teams of animatrices prepare the specified diet and have it ready between 8 and 9 o'clock in the morning for consumption by unspecified neighborhood children, so the animatrice can see that the food is satisfying to the children, is sufficient for U5s and that the process of preparation early in the morning is feasible. That afternoon the animatrice trainees visit all of their 15 selected homes to get all the U5s to attend the weighing scheduled for the following day.

**Day Five.** When the children and their parents, usually mothers, have assembled, monitrice and the animatrices together weigh all the U5s. The program is explained to the parents, including the reason for giving children a balanced meal made up of local foods used by mothers of well-nourished children that is affordable. Parents of children with moderate or severe malnutrition, less than 75% of the standard weight-for-age as percentage of reference median (WAM), are then invited to participate in the foyers. Most accept or are persuaded, and frequently some mildly malnourished children are also accepted into the program.

As might be expected, experience up to the present shows that the menus derived from the “survey” of positive-deviants turn out to be nearly identical from place to place, as does the cost of these menus in the local markets. Because of this, there has been some pressure on the program to shorten the course and merely prescribe this effective menu, without having the trainee animatrices carry out the survey or actually practice buying the menu in the market. The program leaders have strongly resisted this pressure, both because of their conviction that the “discovery approach” to adult education is valid, and because their experience during the process of meeting with and convincing the mothers of poorly nourished children to participate in the foyers convinced them that the derivation of the menu from local homes and the local market is critical to the success of that “marketing” effort.

### **Animatrice Recruitment and Activities**

The animatrices are mothers who volunteer to carry out the Hearth program. These same women, following the completion of the Hearth program, are currently being trained to do other community-level health-related activities such as promotion of exclusive breastfeeding, AIDS and STD preventive measures and family planning.

**Recruitment.** The ideal form of animatrice recruitment probably would be to have communities themselves select, perhaps by election, women to serve this role. In practice the agent responsible for a particular community identifies women from that community who in his or her opinion can do the job well, and then asks them to volunteer. We found the animatrices to be women with attractive personalities, with interest in the work and with obvious leadership qualities. Given that the agent must continue to collaborate with the animatrices in his or her area (about 90% of agents are men), this approach may be both practical and effective in selecting women who are likely to be energetic and capable, although it is susceptible to inappropriate influence.

The animatrice is the front-line worker who is the direct contact with the mothers of malnourished children and, hence, is often the key to the success or failure of the program. Responses of the mothers in various areas where the program has been in action for some time indicate that they clearly identify with “their” animatrice, and have allegiance to her.

**Training.** Trained in the five-day program just described, these volunteer mothers conduct foyers for 12 days, preparing the daily morning meal and overseeing its consumption by the selected malnourished children from the 15 houses in their circle of responsibility (usually from two to six children). They are responsible for ensuring that the children attend the foyers and consume the food. Our interviews with a few animatrices indicated that they responded to the request for them to volunteer because of their desire to serve their community, because they felt an obligation to repay help that had been given to them by the hospital or because they felt that the program was worthwhile and that they would benefit from participating.

Following the training, the animatrices are given the funds to purchase the food, quite a substantial sum by local standards; this helps to convince them that the program is serious. They also know that the families whose children have been selected for participation know precisely what the animatrices are supposed to do with the money, including buying the particular foodstuffs that comprise the menu for the children, as well as the cost of these foods in the local market. Both these influences help to ensure that the animatrices carry out their accepted tasks as designed by the program.

In addition to these motivational inputs, as the foyers progress, the animatrice sees children transformed by the diet from being lethargic, passive and often lacking in appetite, to becoming bright, energetic children who eat ravenously the comparatively huge amounts of food provided. This dramatic change in behavior helps to convince the animatrice that her efforts have had an impact, which appears to strengthen her commitment to the program, the balanced menu and the more frequent feeding pattern the program recommends. However, this process of increasing conviction and deepening commitment by the animatrices has not been objectively assessed.

Following the completion of the 12 days of foyer meals, the animatrices are expected to work with the monitrices to carry out the four- and eight-week follow-up weighing. Some of the

animatrices, it is reported, take an active approach to continued contact with the households of the children who have been in their foyer group, by visiting and interacting with the mother (and perhaps with other caretakers as well) to encourage them to continue the aggressive feeding efforts. It has not been determined what proportion of the animatrices do continue to function in this fashion as motivators following the foyers, nor how long such interaction persists for those who are doing it.

***Continuing education.*** While the creation of the cadre of animatrice volunteer mothers was initially for the purpose of implementing the nutrition foyers, the hospital has begun to extend the role of the animatrices to other preventive community health programs as well. The first such added program was an effort to encourage exclusive breastfeeding for the first six months of life. Like the nutrition foyers, this program too is likely to be maximally effective if it is combined with ongoing monitoring of growth and health status, to demonstrate the positive impact of exclusive breastfeeding on infants.

The HAS community health staff believes that visible results are important motivators for unpaid animatrices. Not that the animatrices prefer this status—they frequently request payment of a salary for their work. But when offered the chance to quit and allow someone else in their neighborhood to take their 15 households, they have universally chosen to continue to serve without pay. HAS is extending the animatrices' activities to include AIDS and STD prevention, and plans to add other preventive efforts in the future. The hospital has no plans for these workers to function in the capacity of community providers of curative primary health care such as oral rehydration therapy (ORT) for diarrhea, because HAS wishes to give maximum emphasis to preventive activities.

With some 1800 animatrices scattered over the Artibonite Valley service district of the hospital, the Community Health Department now has a channel for reaching into every household with information and motivation for preventive efforts. Indeed, the creation of this cadre of volunteer multipurpose community-based workers, with the potential for impact well beyond nutrition alone, must be taken into consideration in calculating the benefits of the Hearth program relative to its costs. The high dropout rate of volunteer community health workers seen in many public health programs in other countries does not seem to be a problem in this program, although objective assessment of the proportion of animatrices who are continuing to function actively has not been carried out.

### **Step-by-Step Implementation Process**

It is useful to characterize the full process used by the Hearth program. The first step in the process after the training of the monitrices is the recruitment of the animatrices by the agent. While the program's intentions are that the households to be served will participate in the identification and selection of the animatrices, it has not been determined to what extent this takes place. From the point of view of the agents, they want an animatrice who is willing to work and easy to collaborate with, especially for later weighing activities. Whatever the level of household participation, it is likely that the households selected for participation do hear about the Hearth program to some extent during the recruitment stage.

**Identification of eligible participants.** Following the first meeting of the monitrice with the selected animatrices as part of the five-day course of animatrice instruction, the animatrices are required to obtain or complete a list of house numbers, children and their birth dates from the 15 households they have chosen to work with, as part of completing the initial “picture” of the area. A draft of the list of houses and children has been prepared in advance by the monitrice in concert with the agent. Having already been introduced to the program, the animatrices are able to tell the mothers what to expect during this visit, and they invite them for the weighing of all their U5s two or three days later on the coming Thursday.

**Identification of positive-deviant menus.** Once they have learned to use the growth card, the animatrices circulate among their 15 households to identify a child whose weight for age is normal, by looking at the growth cards of those children who have participated in the regular weighing program. The mothers of these children are then interviewed by the animatrice to determine the diet they are feeding these children. They record the names of the foods most frequently fed to the children but do not attempt to estimate the quantities of each type of food. This process also attracts the attention of the 15 selected households and others in the neighborhood, and begins to confirm the idea that good nutrition is possible in this environment, using the foods available to every household, even those that are poor. As noted above, the animatrices then collectively determine the menu to be served to the children based on the menus being served by the “positive-deviant” mothers in their community. It should be noted that the animatrices may or may not be such “positive-deviant” mothers. A number of animatrices have had children who were selected to participate in the foyers because they were underweight.

**Selection of foyer participants.** The group weighing is accompanied by administration of deworming medicine, which helps to ensure full participation by the targeted mothers and children, and may contribute substantially to the improved growth of the participating children (although the present evaluation does not attempt to separate out the influence of the deworming). At the weighing, the mothers are informed somewhat more fully about the purposes and activities of the program. The weighing identifies those children under 75% of the reference weight-for-age median, that is, moderately or severely malnourished according to the Gomez classification, who are invited to participate in the program. Although the program established the policy of only inviting children below the 75% cutoff, in fact the foyers included many mildly malnourished children above the 75% cutoff. The sample of 192 program children used in the evaluation included 52 (27%) above the 75% cutoff. Sometimes malnourished children who are not part of one of the 15 selected families attend the group weighing, either at the urging of the agent or monitrice, or because they have heard the news on the “community grapevine.” These children are encouraged to attend the foyers and usually their families are added to those selected and served by the animatrice. In this way, the program ends up reaching most of the malnourished children in the community.

**Education and motivation of mothers.** After the weighing, the mothers of the underweight children are asked to stay behind, and are given a full description of the program by the monitrice in the presence of the animatrices. This includes a description of the process used to determine the menu that will be served to the children at the foyers, namely, the menu derived from the foods most frequently fed by the positive-deviant mothers to their well-nourished children. The similarity

of the positive-deviant mothers to those in attendance is emphasized: they live in the same neighborhood, usually in similar economic conditions, and buy in the same marketplace at the same prices as the other mothers. Thus, the mothers know that they should be readily able to provide the same menu to their own children.

The HAS program staff noted that many mothers are insulted by the invitation to participate because it carries the insinuation that they have not provided adequate care and food to their own child, and as a result some mothers do not readily agree to participate. In these cases the animatrices negotiate in the community with the reluctant mothers, using enticements such as, “participation will enable us to find out if your child has a disease,” and “if your child does not grow adequately he or she will be referred to the hospital for care.” Refusals to participate are described as rare, although the proportion has not been measured objectively nor has it been linked to whether or not visits and negotiation by the animatrices take place.

***Foyer feeding sessions.*** On the following Monday, the animatrice prepares the first of 12 meals at her own hearth. The target time for feeding is set between 8 and 9 o'clock in the morning, a time chosen because it does not compete with any other mealtime in the average household, and also because it requires some hours to cook the beans for the bean sauce that is the primary source of protein in the usual menu. Given that there is a wide spread of ages and the distance is not prohibitive, some children come to the foyer on their own, while others are brought by their mothers or older siblings. It should be noted that this foyer session is not intended to be a mechanism to provide the animatrices an opportunity to harangue the mothers. Rather it is aimed almost entirely at getting a nutritionally rich diet into the participating children.

About 3.8 children participate in the average foyer, which suggests that about 2.8 children out of every 15 households with children are moderately or severely malnourished.<sup>2</sup> Haiti is just emerging from a period of economic hardship related to the embargo and blockade imposed upon it during its political changes. It is quite possible that fewer malnourished children would be found in 15 houses at a future time, should the program be repeated. This might require asking each animatrice to select more than 15 households to ensure a similar number of children for each foyer as at present, or a reduction in the number of children attending if the same admission criteria and families per animatrice were used.

Participants eat the foyer meal daily for 12 days, except on Sundays. The menu is changed from day to day with regard to type of grain (rice, corn) and type of vegetable (various kinds of greens, okra and tomatoes) used, but bean sauce seems to be a constant component, ensuring adequate protein intake.

During this period the more severely malnourished children, who often arrive listless and disinterested in food at the beginning of the 12 days, are “cured” by the enhanced nutritional

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<sup>2</sup> The foyers included nearly all of the moderately and severely malnourished children between the ages of 12 and 60 months from the 15 families served by each animatrice and some of the mildly malnourished children. Twenty-seven percent of the program group was mildly malnourished and 73% was in the moderate and severe category. Thus we can estimate that 73% of the 3.8 children attending the average foyer, or about 2.8 children, were moderately or severely malnourished in each of the 15 households.

intake. They are often transformed, becoming active and playful, losing their cranky, whining or crying mood, and developing such an intense appetite that they often are able to consume amounts of food at a single foyer session that astound their mothers. This behavior change alone is a very powerful motivating factor for the mothers of these children, as well as for the animatrice, providing visible evidence that the recommended menu really works. It would be of interest to document the proportion of participating children who do exhibit this dramatic behavioral transformation.

Following the two weeks of foyer feedings, full responsibility for feeding reverts to the mother, who is encouraged to continue the foyer menu. The HAS program in Haiti does not specifically encourage an increase in feeding frequency, while the Bangladesh Hearth program, in contrast, has set the feeding of these children more frequently as a specific behavioral target. The HAS program also has not measured changes in the frequency of feeding at various times following the foyer sessions.

***Follow-up weighings.*** Repeat weighings are scheduled by the monitrices at four weeks and eight weeks following the foyers. The animatrices are expected to motivate the families of the participant children to attend. *Ad hoc* observations have noted that the children who have benefited least from the foyer feedings are often those brought to the weighing by a neighbor or older sibling, not by the mother. The weighings are accompanied by counseling aimed at encouraging the mothers to continue the foyer diet.

Children who have not gained at least 200 grams during the eight weeks are considered “failures,” and are referred to HAS for assessment and treatment by a pediatrician. A small sample indicates that approximately 30% of the participants in the HAS program fall into this category. Of these, about 30% are found to have tuberculosis and are treated accordingly. The remaining 70% of the failures are a mixture of problems—some medical, some social. Detailed assessment of this remainder has not been carried out up to this time.

Following the eight-week weighing, the children are expected to attend the routine weighing conducted by the agent at nearby rally posts. The animatrices are expected to collaborate with the agents in getting the children to attend, and several animatrices have reported that they continue to visit the families of the children who were in their foyers. No assessment of participation in regular weighing by the program children as compared to comparison children, nor any formal assessment of the activities of animatrices in continuing to motivate the mothers of their foyer children, has yet been made.

***Women’s microenterprise program.*** A recent addition to the effort is the Women’s Microenterprise Program (WMP). This program picks up eight-week foyer failures who show continued failure to grow at one year. In 1996, 65 women were offered the opportunity to participate in the WMP and 53 accepted. Following a 10-session training program, the women were hired to work in teams to prepare mid-morning lunches for five schools, based on the dietary principles used in the foyers. Program personnel visit the homes of participating mothers during their work periods, and where adequate arrangements for care of the children are absent or where the children fail to gain weight during the early weeks of the effort, the mothers are eliminated from the WMP.

A complex financial arrangement for repayment of loans and required savings ensures that the mothers who complete the four- to five-month program will have a sizable amount of capital to invest in some commercial enterprise, approximately \$50 (U.S.). This component of the program has not been formally evaluated, but in *ad hoc* interviews, eight participants were uniformly unable to describe in any detail what they plan to do with the capital they will receive. Most plan to use it for some sort of petty trading, hoping for a small profit on sales of household food items. None indicated hopes to initiate either production of a salable product (including cooked food) or service activities. One did indicate her intention to sell produce from her own garden.

The cost of the HAS program is running about \$7 (U.S.) per program participant. This includes about \$3 for food (\$.25 per meal), and another \$4 for all costs associated with salaries, transportation, supervision and documentation for monitrices and other program staff.

### Comparison with Other Nutrition Programs

The design of the HAS Hearth program is the result of several decades of experience and learning from other efforts to rehabilitate and prevent malnutrition in preschool children. The lessons from those previous attempts, both positive and negative, and the resulting similarities and differences of the HAS Hearth program to the programs from the past is instructive for understanding the operation of the current Hearth program. This section discusses some of these similarities and differences, and the reasons why the HAS team chose the approach it did. Much of the information on Mothercraft Centers and NDF programs comes from Berggren et al. (1984).

**Hospital-based programs.** The greatest contrast to the Hearth program is hospital-based nutritional rehabilitation, which was and is still being practiced at HAS for those very severely malnourished children who find their way to the hospital, usually for illness. In fact, part of the rationale for the Hearth program is that its success will move the care of most malnourished children out of the hospital and into the community, thus reducing the number of children admitted to the hospital for malnutrition. Hospitals are typically far from the homes of the majority of malnourished patients, making access to care difficult for many. Management of a malnourished child in a hospital “medicalizes” malnutrition and its care, leading to the inappropriate belief that it is a medical rather than a social or behavioral problem that can and should be handled in the home. Most malnourished children managed in the hospital receive medicines, leading mothers to think that the medicines are responsible for the reduction in malnutrition and the return of energy and life to the child.

**Mothercraft Centers.** While Mothercraft Centers based at hospitals often may be effective in teaching mothers of malnourished children (that is, when a mother is able to attend her child there), it is unlikely that those lessons are spread widely in the community on her return home. Hospital care of malnutrition is very costly and can usually be available only to comparatively few children during a year. Thus, no significant reduction in the entire community’s nutrition problem can be expected. It obviously represents an alternative suitable only for the sickest and most severely malnourished children, because it has almost no public health or epidemiologic impact.

The earliest community alternatives were fixed Mothercraft Centers located in a community building. The Haitian version of this strategy, called the CERN, was run by a monitrice and accepted from 15 to 30 children at a time, many more than those attending a single animatrice's foyer in the HAS Hearth program. But the CERN activities went on six days a week for three to four months for each group of children, making it difficult for these programs to deal effectively with the overall community load of malnutrition in a large population. The children stayed for most of the day, rather than just a couple of hours as in the current Hearth program, and mothers typically would attend once or twice during the two weeks. The mothers who were present received structured teaching (some might say preaching) every day for one to two hours, rather than the learning-by-demonstration-and-doing approach seen in the HAS program.

CERNs usually emphasized use of a special blend of cereal with a legume (akamil) rather than the ordinary foods from the market emphasized in the HAS foyers, again making it appear that a kind of "medicine" was needed to overcome malnutrition. Menus were determined by "experts" at universities, rather than derived from the practices of positive-deviant mothers, living in the very neighborhood, whose children were not malnourished. While communities in which a CERN was located might well show a reduction in overall rates of malnutrition, the fixed location of CERNs meant that more distant communities were not likely to benefit from the effort. CERNs had the potential for mobility, but in practice often stayed in one place for a long time, thus being inaccessible to many mothers. The CERNs functioned like a kind of SWAT team, coming in from the outside for an extended period of time, with little of the community mobilization that is at the heart of the Hearth approach, and no ongoing GMP program to provide a focus for follow-up assessments and continuing motivation of the mothers.

As stated earlier, it was the high cost of the CERN, the small number of children served per year (only about 100 when 10 times that figure was needed for the typical community), the extended duration of each session and the lack of mobility leading to poor coverage of the malnourished population that led to the next approach used in the Haitian context, the Nutrition Demonstration Foyer (NDF).

***Nutrition Demonstration Foyers.*** The NDF was the immediate precursor of the HAS Hearth program. Developed in the mid-1970s, it combined the demonstration or Mothercraft elements of the CERNs with an ongoing nutrition monitoring program, and limited the demonstration period to two weeks rather than three to four months. This shorter period, while not completing the rehabilitation and recovery process, was sufficiently long for the improved diet and increased quantity and frequency of feedings to produce the improvements in the malnourished child's level of activity and interaction with the mother that would convince her that the approach was effective. She could then complete the process herself, with monthly monitoring of the child's weight gain to provide ongoing support.

The NDF approach used a borrowed community kitchen (the *foyer*, or hearth) in a three-week cycle of activities. During the first week, the monitrice made advance visits to the community, negotiated for the kitchen to be used and obtained agreement of the mothers to attend every day for the two weeks of sessions. Instead of including only the malnourished children, nearly all U5s from a particular village location were included. All were weighed and the result on a *Road-to-Health* card was explained to the mother. The monitrice then stayed in the village and led the

## Hearth Model

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daily sessions in which she and the mothers cooked and administered the food to the children. In the following week the monitrice prepared her report and carried out the advance visits to the next location. With 20 to 25 mothers in each “course,” she could cover from 340 to 425 families in a year.

Some important differences between the earlier NDF and the subsequent HAS Hearth model include:

- Each NDF foyer contains a much larger group of children (and mothers), from 20 to 25 versus from 3 to 4 in the HAS Hearth program foyers. The NDF requires large-scale cooking, with special large pots provided by the monitrice, rather than the simpler family-scale cooking with ordinary-sized pots of the Hearth model. Note, however, that the HAS Hearth model includes 8 to 20 new animatrices per three-week cycle, each of whom feeds an average of 3.8 malnourished children, making for a total productivity of from 30 to 76 children per cycle, so the output is potentially greater with the Hearth model.
- In the NDF model, there is no local volunteer mother to take responsibility; the monitrice works directly with the participating mothers. In the Hearth model, from 8 to 20 village women per cycle become animatrices who promote the new diet and feeding approach, and are subsequently available for other health promotion activities in addition to nutrition.
- Only one monitrice runs the NDF program cycle, while the Hearth model currently uses two monitricers to run each cycle. HAS believes it can cut back to one monitrice per cycle, but so far they are working in pairs.
- The daily sessions are longer in the NDF model, 8 o’clock in the morning to 2:30 in the afternoon, with much more emphasis on structured education and demonstration activities by the monitrice. This contrasts with the shorter time of about an hour sometime between 8 and 10 o’clock in the morning and the informal interaction of the mothers with the animatrices during the Hearth program foyers. In the Hearth model, the emphasis is on just getting the food into the child and letting the changes in the child speak for themselves. The only structured education for the community mothers in the Hearth model is at the weighing session the week before the foyers begin, when the monitricers explain the process and its rationale to the mothers whose malnourished children have been selected to participate. There is extensive education of the animatrices, however, which is likely to be reflected in both their actions and in the messages they convey to their neighboring mothers in informal conversations during the two weeks of feeding and beyond.
- In the NDF, the menu is “imposed” by the monitrice, rather than being developed from the diets of the better-nourished children in each locality as is done in the Hearth model. The NDF program does use local foods, however, not akamil or other special mixes.
- The NDF has no market exercise in which the animatrices prove to themselves that they can buy the ingredients for a healthy diet at their own market at an affordable price.
- The NDF foyers provide three meals a day—a morning snack, a mid-day balanced meal and an afternoon snack. The Hearth program provides only one meal per day.

- The NDF has no formally defined mechanism for referral of a particular group of children to a source of medical assessment and care; in contrast the Hearth program formally refers those who have failed to progress at the eight-week weighing.
- There is no income-generation component in the NDF model. The Hearth model has recently added such a component.

Both the NDF and the Hearth programs in Haiti emphasize community mobilization, but the direct involvement of the participating animatrices in the Hearth model seems likely to be more effective in stimulating changes in community attitudes and practices over time than the NDF programs, which rely solely on monitrices.

### Comparison between Existing Hearth Programs

Two other implementations of the Hearth model besides that at HAS are reported in this volume, one in Vietnam (Sternin et al. 1997) and the other a more recent implementation in Bangladesh by World Relief Corporation (WRC) and the Christian Service Society (CSS) reported by Filoramo (1997). These other programs are very similar to the Haitian one, but there are some important variations, which may be particularly appropriate in the Vietnamese or Bangladeshi settings:

- In the Vietnam program, more attention is given to community mobilization and to the education of the whole community. They hold repeated meetings with the community in which commune leaders as well as mothers are actively included, and these meetings are the occasion for structured education of those who attend.
- Based on the community weighings, the Vietnamese educators prepare pie charts showing the various levels of malnutrition among the commune population. These appear to have been particularly effective in convincing the whole community that they really do have a malnutrition problem.
- All three programs do 24-hour dietary recall data collection, but whereas the Haiti program seeks out well-nourished children and assesses only their diets, the Vietnam program collects dietary information from both well-nourished and poorly nourished children, and then contrasts it. This appears to be particularly useful there, because the mothers of well-nourished children appear to include additional nutrient-dense components, (*e.g.*, freely available paddy shellfish and greens from irrigation channels) in their children's diets. In Bangladesh, they find that the components of the diets of the well-nourished and poorly nourished are similar, but the variety and frequency of feeding is greater in the better-nourished children. Thus their recall survey emphasizes frequency of feeding and variation in components.
- In Bangladesh, they had trouble finding a meal made from generally used local ingredients that would reach 700 calories. Crushed peanuts were cheap and very acceptable and so were incorporated, even though they were not used much by positive-deviant mothers.
- In Haiti, the volunteer mothers participate in a market exercise in which they buy the recommended diet. In Vietnam, the mothers of the malnourished children are asked to

contribute food each day as their “entry ticket” to the foyer. In Bangladesh, a volunteer community male is asked to shop for food because women do not go to the marketplace as a part of the traditional observance of “purdah.”

- In Haiti, each foyer session is only two weeks in duration. In Vietnam, the special feedings and education of the mothers are extended beyond two weeks or repeated for those mothers whose children have not yet responded with improved growth.

These differences, while minor, may be vital to the success of the program in certain environments.

## Evaluation

### Program and Evaluation Objectives

The HAS Hearth program has several short-term and long-term objectives. The short-term objectives include the nutritional rehabilitation and maintenance of the preschool children who participate in the program. The long-term objectives include reducing the prevalence of malnutrition in the communities served and the development of a network of volunteer mothers to help the hospital provide improved primary health care throughout its service area.

The present evaluation is limited to one of the short-term objectives, namely, the reduction of weight-for-age malnutrition in program participants over a period of one year. This evaluation does not address the issue of the immediate rehabilitation of the moderately and severely malnourished participants during the program or the practices and attitudes of the mothers. Nor does it address the long-term objectives of reducing the prevalence of malnutrition in the population (in contrast to the prevalence in program participants) or creating a sustaining network of effective volunteers. These are important limitations because the findings of this evaluation will not be adequate to judge the overall value of the program. Nevertheless, the evaluation may be able to suggest whether the program is headed in the right direction and how a more definitive evaluation could be undertaken.

### Evaluation Methodology

This evaluation was initiated in 1994 by HAS to study the one-year impact of the program on the nutritional status of participating children. Data collection and preliminary analysis was done by Jeff Grant under the direction of Warren L. Berggren. Details of the procedures used in data collection and some preliminary results are given in a paper by Grant (1995). The authors of the present paper traveled to HAS in May 1996, where they worked with Berggren and others on the hospital staff to further the evaluation.

The evaluation uses a quasi-experimental panel design, with pre- and post- measurements of simultaneous program and comparison groups. The pre- and post-weighings were taken approximately 12 months apart, the pre-weighing occurring when the child entered the program. For the program group, pre- and post-weighings were obtained for a sample of 192 children who participated in the Hearth program during its first six months of implementation from October

1993 to March 1994, a period referred to as the *intervention period*. Corresponding pre- and post-measurement data were obtained for a comparison sample of 185 children who did not participate in the program but who had characteristics in common with the program children. The program group was a sample of all program participants, obtained by systematically selecting every seventh participant from the list of children who participated in the program during the intervention period, with substitution of the next child on the list when the seventh child could not be located. There were 49 substitutions. The 192 children in the program sample came from 59 different communities.

The comparison group included U5s from communities similar to the program communities in all respects except that they had not yet participated in the Hearth program. The comparison children were similar to the program children as well with respect to age and nutritional status. The only difference was that while all the comparison children were participating in the GMP program and had Road-to-Health cards showing they were underweight during the program intervention period, approximately three-quarters of the program children were not participating in the GMP program. Note that the participating children were not representative of all the preschool children in the program communities, because the program contained a preponderance of moderately and severely malnourished children. The samples comprising the program and comparison groups may suffer from selection biases as noted below in the section on evaluation results.

A team of one observer and one recorder went to the field about one year after the intervention period to find and weigh the children selected in the program group. The pre-weights were available from the program records. To obtain the control sample, 154 rally posts were assembled in all the villages that had not yet participated in the program. There, a three-person team identified the children who qualified for the comparison group, recorded the pre-weights from their Road-to-Health cards, completed and recorded the post-weighing and provided various other health services. Whenever possible, the younger siblings of the children in the comparison group were weighed and the mothers were questioned about mortality among younger siblings. The data were collected in two distinct phases—one for foyers implemented from October through December 1993 and the second for foyers implemented from January through March 1994.

In addition, two focus groups were held with mothers of program children. One included eight mothers of program children with the largest gains in weight-for-age in the year following the program, and the other included eight mothers of program children with the smallest weight-for-age increments.

The data were entered into Epi Info (Dean et al. 1994) and Paradox files at HAS in the summer of 1995. The data are organized by treatment group, *i.e.*, program and comparison and by phase (phase 1 is October to December 1993 and phase 2 is January to March 1994). Each file contains the following variables:

Case identification number

HASNO (hospital identification number)

Name, sex and resident community of child

Birth date of child  
Name of volunteer mother for program children  
Dates of pre-weighing and post-weighing  
Weight in kilograms at pre-weighing ( $weight_1$ ) and post-weighing ( $weight_2$ )  
Weight gain ( $weight_2 - weight_1$ )  
WAM as calculated from  $weight_1$  and  $weight_2$   
WAM gain ( $WAM_2 - WAM_1$ )<sup>3</sup>  
WAZ as calculated from  $weight_1$  and  $weight_2$   
WAZ gain ( $WAZ_2 - WAZ_1$ )<sup>4</sup>  
PHASE (from the file organization, not as an explicit variable)  
Program (from the file organization, not as an explicit variable)

The WAM and WAZ variables were calculated using Epi Info by HAS and Grant (1994). Note that information was *not* obtained on the results of: the four- and eight-week weighings; program children who were referred to the hospital as a result of the eight-week weighing; the diagnosis, treatment or outcome of referred children; whether or not the program children had a Road-to-Health card.

### Evaluation Results

**Early report.** Grant (1994) reported preliminary results. Within the Hearth program participants, the percentage of positive WAM and WAZ increments was 52.2% and 58.5%, respectively, compared to only 40.6% and 44.4% in the comparison group. Grant compared the nutritional status and mortality rate of younger siblings of the program and comparison group children. More younger siblings of program group children suffered moderate or severe malnutrition (13 of 53, or 24.5%) than siblings of the comparison group (5 of 31, or 16%), while fewer younger siblings of program group children died during the previous year (two, including one stillbirth, or 20/1000 livebirths) than younger siblings of the comparison children (four, or 100/1000 livebirths). Finally, Grant reported that there were no discernible differences between the focus groups in terms of feeding practices, hopes for the children, husband's roles and play activities of children. Both groups had very positive feelings about the foyers.

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<sup>3</sup> WAM is Weight-for-Age as percentage of reference median. WAM1 is WAM at first weighing. WAM2 is WAM at second weighing.

<sup>4</sup> WAZ is Weight-for-Age Z-score. WAZ1 is WAZ at first weighing. WAZ2 is WAZ at second weighing.

**Effect of program without accounting for confounders.** The four indicators of one-year weight gain in Table 3-1 all show slightly higher gains in the program group than the comparison group, but only one of the four differences (percentage with positive WAZ gain) is close to being significant ( $p < .08$ ). The fact that small improvements were present in both the program and comparison groups underscores the importance of a multivariate analysis that accounts for confounders, and as

**Table 3-1. Difference between Program and Comparison Children for Four Indicators of 1-Year Weight Gain without Accounting for Confounders**

Item	Program	Comparison	Significance of Difference
Sample size	192	185	
Average WAZ gain	0.13	0.06	$p = .27$ (t-test)
Average WAM gain	0.83	0.06	$p = .27$ (t-test)
Percentage of children with positive WAZ gain	58.3 (112/192)	48.1 (89/185)	$p = .08$ (Chi-sq)
Percentage of children with positive WAM gain	51.0 (98/192)	45.4 (84/185)	$p = .33$ (Chi-sq)

we shall see, that analysis shows a much larger and more significant program effect than appears in Table 3-1.

Dubuisson et al. (1994) reported the change in percentage of moderately and severely underweight children for a similar Nutrition Demonstration Foyer program in Haiti relative to its control. Table 3-2 compares the Dubuisson et al. results to similar statistics for the HAS data. The results show a more dramatic effect in the Dubuisson study than in the HAS data. Although the comparison is interesting, these results are not conclusive judgments on the impact of either program because they do not adequately account for confounders. Further, the percentages from the two studies do not reflect prevalence and may not be strictly comparable because the program participants were drawn from the more malnourished segment of the population by methods that may have differed.

**Potential confounders and other threats.** Many different factors might confound the analysis or otherwise threaten the validity of the conclusion. In this analysis we have been able to address many, but not all, of these potential threats, as summarized in Table 3-3.

**GMP effects.** All of the children in the comparison were active in the HAS GMP program, whereas only about one-third of the program group were in the GMP program. Therefore, if GMP has any impact on growth, the effects will manifest in both groups, but to a greater extent in the

**Table 3-2. Percentage of Moderately and Severely Malnourished Children (<75% WAM) in Two Haitian Studies**

Study	Group (n)	Pre-measurement	Post-measurement	Percentage Point Gain
HAS	Program (192)	72.9%	62.0%	10.9
	Comparison (185)	76.2%	69.7%	6.5
Dubuisson et al. (1994)	Program (122)	76.9%	46.3%	30.6
	Control (96)	63.5%	63.5%	0

Note: There is a one-year duration between the pre- and post-measurements in the HAS study and a three-year duration in the Dubuisson et al. study.

comparison group. In other words, the *absolute* gain in nutritional status observed in the program group will overstate the true program effect because part of it will be due to the GMP, but the *net* gain in nutritional status observed in the program group (program gain minus comparison gain) will understate the true program effect because the GMP will have a larger effect on the comparison than on the program group.

*Historical effects and regression-toward-the-mean.* These are likely to manifest equally in the program and comparison groups and thus are adequately controlled by the comparison group. This is important because both historical effects and regression-toward-the-mean could influence the gain in nutritional status—historical effects as a result of the economic and political changes experienced by Haiti during the data collection period, and regression-toward-the-mean because the program and comparison samples were selected from the lower range of the WAM distribution. Although historical effects and regression-toward-the-mean are confounded with each other and potentially with the GMP effect—thereby preventing a useful analysis of the separate effect of these factors—the comparison group controls for their combined effect and they therefore are not an influence on the final result.

**Table 3-3. Summary of Possible Confounders and Other Threats to Validity and Their Effect on 1-Year Gain in Nutritional Status**

Confounders and Other Threats	Controlled or Analyzed in Study?	WAZ Effect Found by Study?	Probable Direction of Effect	Comments
GMP effect	Partial	Probable	Positive	Confounded with historical and regression-toward-the-mean effects
Historical effects	Yes	Probable	Neutral	Under control
Regression-to-mean	Yes	Probable	Neutral	Under control
Age:				
Samples differ	Yes	Yes	Neutral	Program children older
Interaction with WAZ	Yes	No	NA	No correlation
Interaction with program	Yes	No	NA	No correlation
Initial nutritional status:				
Samples differ	Yes	No	NA	Same pre-WAZ
Interaction with program	Yes	Strong effect	Positive	Program reduces deterioration in mildly malnourished
Program learning	Yes	No	NA	NA
Community effect	No	NA	Positive	Positive impact on nonparticipants likely
Selection bias:				
More attentive mothers in comparison group	No	NA	NA	Might understate effect
Every 7th participant	No	NA	NA	
Unfound participants	No	NA	NA	Few; effect unlikely
Program refusers	No	NA	NA	
Mildly malnourished participants	No	NA	NA	Might overstate effect

Note: NA = Not applicable

*Age.* Age is a potential confounder because the program group children were, on average, nearly six months older than the comparison group children (34.5 months vs. 29.0 months). Age might influence the outcome in two ways: first, the responsiveness of children to interventions, either planned (*e.g.*, the program) or unplanned (*e.g.*, historical events) could vary with age; and second, the prevalence and severity of malnutrition in the study population may change with age, with the result that differences between the program and comparison groups could simply reflect effects of this natural aging process. Remarkably, neither of these two potential factors appears to be a confounder in this data set. A simple linear regression of age on WAZ gain found no relationship whatsoever in either the program or comparison group. The R-square values and the coefficients of age were very small in both models, thus eliminating age as a concern in spite of the difference in age between the two groups. To investigate nonlinear relationships between age and weight-for-age status, initial WAZ was compared for children in 6-month age categories. No significant difference in WAZ1 was found between the program and comparison groups using a Chi-square test.

*Nutritional path.* On the surface, it appears that the initial nutritional status, for example, as measured by WAZ1, is not a confounder because the average value of WAZ1 in the program and comparison groups is essentially the same (-2.75 in the program vs. -2.68 in the comparison). However, given the rehabilitation goal of the program, it is reasonable to suspect that children entering the program with lower nutritional status are more likely to respond than children with higher nutritional status, suggesting that the interaction of program and initial nutritional status may be an important determinant of program effect on nutritional status. The data in Tables 3-4 and 3-5 suggest that, indeed, this interaction may have a significant influence on change in nutritional status, but the direction of the effect is the opposite of that anticipated. The one-year effect of the program may be to prevent increased malnutrition in the mildly malnourished rather than to rehabilitate the moderately and severely malnourished. This can be seen most clearly in Table 3-5, which shows the combination of nutritional states that the children followed in the pre- and post-measurements—High-to-High, High-to-Low, Low-to-Low, and Low-to-High. These four combinations are termed *nutritional paths*.

In the program group, only 12 of 52 (23.1%) drop from high to low status during the year between the pre- and post-weighings, compared to 16 of 44 (36.4%) in the comparison group. Thus, more (77%) of the high-status program children maintain their high status than the children in the comparison group (only 64%). Conversely, roughly equal percentages of program and comparison children rise from low to high nutritional status. Although not conclusive, this result suggests that perhaps the program is better at preventing deterioration in the mildly malnourished than curing the severely malnourished. This interpretation is supported by the multivariate analysis reported below.

**Table 3-4. Number of Children by Nutritional Status Category**

Nutritional Status	Program		Comparison	
	Pre-measurement	Post-measurement	Pre-measurement	Post-measurement
75% WAM or above (High)	52	73	44	56
Below 75% WAM (Low)	140	119	141	129
<b>Total</b>	192	192	185	185

**Table 3-5. Number of Children by Nutritional Path**

Path	Program	Comparison
High-to-High	40	28
High-to-Low	12	16
Low-to-Low	107	113
Low-to-High	33	28

*Phase effect.* A phase effect manifesting across both the program and comparison groups might reflect the influence of external events, while a phase effect in the program group only might reflect program learning. In fact, Table 3-6 shows a similar phase effect in both groups, and no additional effect in the program group. Thus, it is likely that external events have caused a general improvement in nutritional status in the period between phase 1 and phase 2, but there was no program learning between the two phases. This conclusion is borne out in the multivariate analysis, where the addition of the interactive term (PHASExPROGRAM) to the model has no effect.

*Community effect.* It is plausible that the program caused a community effect, in which the nutritional status of nonparticipating children in the program communities improved over the study year relative to the comparison communities. However, the data set did not permit such an analysis. Other behavioral change programs that have looked for such a community effect have often found it (Hornik 1990; Hornik et al.1992). Thus it is likely that the present analysis underestimates the true effect of the program because it has not taken the community effect into account.

*Selection biases.* Finally, several types of selection biases may have influenced the results. First, the comparison group selected only children who had a Road-to-Health card and who had been weighed and were found to be malnourished one year earlier, while the program group used a totally different selection procedure that was not based at all on the presence or absence of a Road-to-Health card. Only about one-third of the preschool children in the Hearth program communities were enrolled in GMP by the time the Hearth program was implemented in these communities. It is not clear whether this difference tends to: underestimate the effect of the program because children with cards are more responsive to the program than children without

## Hearth Model

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cards; overestimate the effect of the program because children with cards are less responsive; or has no effect at all.

We suspect that the comparison group may well consist of children with more attentive mothers who are more likely to participate in community health programs (such as GMP) than the average mother of the program children. Further, the comparison children are more likely to be referred for medical care when they need it because of their participation in the GMP program. Thus, this selection bias is likely to underestimate the true effect of the program. Second, the program sample

**Table 3-6. Average Gain in WAZ and WAM by Phase**

	Program Group		Comparison Group	
	WAZ Gain	WAM Gain	WAZ Gain	WAM Gain
Phase 1	0.07	0.25	0.01	-0.52
Phase 2	0.16	1.15	0.09	0.47

was selected by picking every seventh child on the roster of participants, a method that systematically excludes siblings, including twins. It is uncertain whether this tends to over- or underestimate the program effect. Third, some of the children nominated for the program sample by the “every seventh name” method were not actually found in the field for various reasons, including death and relocation. Other names were substituted for the unfound children, *i.e.*, the next participant listed on the roster. It is uncertain whether the unfound children were systematically different from the found children, and whether this potential bias would tend to over- or underestimate program effect.

Fourth, the households selected by the animatrices for participation in the program were neither a 100% sample of the community nor a random selection, and thus are subject to selection bias. While the program staff believe the foyers included a preponderance of all the moderately and severely malnourished U5s in the program communities, the program did not weigh 100% of the children in the community and, therefore, did not enroll every last one of the malnourished children. It is not clear how this possible bias might influence the results. Fifth, the program included a substantial number of participants (27% of the program group) who were mildly malnourished in spite of the fact that it did not formally intend to include these children. The method by which they became participants and the differences between the participating and nonparticipating mildly malnourished is unclear and may well involve an important selection bias. Although the nature of that bias is unclear, it is plausible that the mothers of mildly malnourished children who participated in the program were more aggressive and made sure they did participate, a characteristic that might cause these children to be more responsive to interventions, and might cause the results to overstate the actual effect of the program.

***Multivariate analysis (accounting for confounders).*** The study data enabled some but not all of the potential confounders to be included as independent variables in a multivariate analysis. The model uses WAZ2 as the dependent variable and five independent variables: TREATMENT (program or comparison), WAZ1, AGE in months, PHASE and TREATMENTXWAZ1. The latter variable (TREATMENTXWAZ1) reflects the different responsiveness of high WAZ1 children and low WAZ1 children to the program. WAZ2 is used instead of WAZ gain to avoid the technical problem associated with the fact that WAZ gain is a linear composite of WAZ1 and WAZ2. In fact, when WAZ gain is substituted for WAZ2 as the dependent variable, there is essentially no difference in the results. As seen in Table 3-7, three of the five independent variables in the WAZ2 model are highly significant (WAZ1, TREATMENT and TREATMENTXWAZ1), one (PHASE) approaches significance ( $p=.08$ )

**Table 3-7. Results of a Multivariate Analysis with WAZ2 as the Dependent Variable**

Term	F Value	Significance
TREATMENT	9.8	$p = .002$
PHASE	3.6	$p = .058$
Initial WAZ (WAZ1)	47.6	$p = .0001$
AGE	0.8	$p = .368$
TREATMENT xWAZ1	8.9	$p = .003$

**Table 3-7. Results of a Multivariate Analysis  
with WAZ2 as the Dependent Variable**

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Note: This analysis used an ordinary least squares regression model calculated using SAS, GLS procedure. TREATMENT signifies program or control.

and one (AGE) clearly is not significant. Treatment is significant only when accompanied by the interactive TREATMENTxWAZ1 term. As expected, WAZ1 is most important in predicting WAZ2, but, surprisingly, the combination of TREATMENT and TREATMENTxWAZ1 is most important in predicting WAZ gain.

The key result of the multivariate analysis is that the program has a strong, positive and highly significant effect on nutritional status, but only for children with relatively higher nutritional status at the beginning of the program. The effect on children entering the program with lower nutritional status is not statistically significant and tends to be negative.

To determine whether this counter-intuitive result is a statistical artifact caused by imposing a linear model on the data, the program and comparison groups were divided into four equal categories by WAZ1 quartiles, and a WAZ gain regression analysis was performed for each quartile. The model predicts WAZ gain as a function of TREATMENT, AGE and PHASE. Children in the top WAZ1 quartile, which includes most of the mildly malnourished, do decidedly better if they are in the program than if they are in the comparison (.32 greater average WAZ gain by program children,  $p=.014$ ). Program and comparison children in the middle two WAZ1 quartiles have about the same WAZ gain; and children in the bottom WAZ1 quartile, which includes all the severely malnourished children, do worse if they are exposed to the program than if they are not, although this difference is not statistically significant (.16 greater average WAZ gain by comparison children,  $p=.224$ ). Thus this analysis confirms that the counter-intuitive result obtained above is a program effect and not an artifact of the linear model.

To estimate the size of the effect of the program, the WAZ2 multivariate model reported in Table 3-7 was used to compute WAZ2 and WAZ gain for different values of WAZ1, AGE and PHASE, although these had essentially no effect on WAZ gain. The results of this simulation, reported in Table 3-8, show that program children with WAZ1 equal to -2.0 average about 0.3 higher WAZ gain; in other words, three-tenths of a standard deviation higher in the program children—which works out to be about one pound of additional weight in a 36-month-old—than the comparison children with the same WAZ1. Program and comparison children with WAZ1 of -3.0 average about the same WAZ

**Table 3-8. Predicted Impact of the Program on the Gain in Nutritional Status for Participant Children with Different Initial WAZ**

Initial WAZ (WAZ1)	WAZ Gain		Gain in WAZ due to Program
	Program	Comparison	
- 2.0	0.11	- 0.19	0.30
- 3.0	0.21	0.24	- 0.03
- 4.0	0.31	0.67	- 0.36

Note: The model predicts WAZ2 as a function of five variables—WAZ1, TREATMENT, PHASE, AGE and TREATMENT×WAZ1. WAZ gain is obtained by subtracting the assumed WAZ1 from the predicted WAZ2. Phase and age do not influence the results. In a separate analysis by WAZ1 quartiles (see text), the difference between the program and comparison was statistically significant in the highest quartile of WAZ1 but not in the lower three quartiles, thus suggesting that in this table the WAZ gain reported for WAZ1 of -2.0 may be more reliable than the loss in WAZ gain when WAZ1 equals -4.0.

gain, and program children with WAZ1 of -4.0 average 0.36 less WAZ gain than the comparisons, although as noted above, the difference between program and comparisons at WAZ1= -4.0 and -3.0 is not statistically significant.

## Discussion

The Hearth program developed at the Hôpital Albert Schweitzer in Haiti by Berggren and his colleagues builds on earlier programs in Haiti and elsewhere. Hearth aims to be as or more effective than the earlier programs in reducing malnutrition, but at a lower cost and with greater community participation. The present effort to document and evaluate the program produced several surprising results and raised a number of interesting issues.

The evaluation compared the one-year gain in nutritional status in a sample of 192 preschool children who participated in the program to a comparison group of 185 preschoolers from nonparticipating communities. In spite of the fact that one of the primary objectives of the program was to rehabilitate moderately and severely malnourished children, a multivariate analysis of the data showed that the program prevented nutritional deterioration in mildly underweight children relative to the comparisons, but severely underweight children became worse off relative to the comparisons (although this latter result was not statistically significant). What can explain these surprising results?

The first part of this result, preventing deterioration of the mildly malnourished, might simply reflect real learning on the part of the mothers of mildly malnourished children in combination with a lower burden of serious infectious disease that is more likely to be found in the severely malnourished. There is anecdotal evidence that the volunteer mothers maintain informal contact with many of the mothers in their group in the year following the foyers, and it is not implausible that such contact may be greater or more effective with the former than with mothers of more

severely malnourished children—the mothers of mildly malnourished children may be more responsive and competent. This result might also be partially explained by selection bias, that is, the mothers who got their mildly malnourished children into the foyers may be more attentive and/or aggressive than the mothers of the mildly malnourished in the comparison group, and thus are more likely to keep their children from getting worse than the corresponding mothers in the comparison group.

The second part of the surprising result, namely that the severely malnourished program children appear to do worse than the comparison children, is more difficult to explain. However, the Road-to-Health card selection bias may be the reason. In effect, that bias means that the comparison group is really a GMP group rather than a baseline group because 100% of the comparison group were in the GMP program for the year following the foyers compared to only about one-third of the program group. It may be that the GMP program is more effective in dealing with severely malnourished children over the course of a year (*e.g.*, because they are more likely to be referred for medical care when they need it) and the Hearth program is more effective in dealing with mildly malnourished. The severely malnourished may well require the more persistent approach of a well-run GMP program. If so, then the combination of GMP and Hearth should produce the best results.

Nevertheless, it is important to keep in mind that the result of the analysis, although unexpected and not easily explained, was very strong. The relationship between the program and the one-year gain in nutritional status of the mildly malnourished was highly significant ( $p < .01$ ) and quite large (nearly a third of a standard deviation).

Another unexpected finding was the complete lack of association between the age of the participants and either their nutritional status or response to the program. Other studies in the literature have consistently reported the opposite (Schroeder et al. 1995). We do not understand the reasons for this difference, but it may suggest that the Haitian population studied differed in fundamental ways from the other populations studied.

The design of the HAS version of the Hearth program contains several surprises in the sense that it differs from our early expectations about the program, which were based on what was written about the HAS and other Hearth programs. First, the fact that one of the major goals of the program is to “jump-start” a network of volunteer mothers that can then help deliver community-oriented primary care by using the strong positive reinforcements derived from watching malnourished children rehabilitate is extremely interesting and practical, but was unexpected. Our unsystematic observations and discussions indicate that the program is achieving this objective.

Related to the above is the approach used to select the volunteer mothers and the participant children. Many programs that develop networks of volunteer health workers take an almost geometric approach, dividing the service area into small subareas such as a village, a neighborhood or half a village, each serviced by one volunteer who is supposed to service everybody who lives there. Not so with the HAS Hearth program, where the volunteers are selected because they have a lot of personality and interest, where the volunteers may live next to or very near each other, and where the participants are selected by these volunteers. The HAS Hearth model thus taps more into the dynamics of the community [as depicted by a diffusion of

innovation model (Rogers 1962)] than into its geometry. We suspect that the HAS approach is better suited to the high mobility of families that is characteristic of Haiti.

Much has been made of the use of the “positive-deviance” approach by this and other Hearth programs to identify local foods and practices that would be effective and affordable at the local level. However, we believe that this positive-deviance approach functions in the HAS program primarily to promote the feeding behaviors advocated by the program (*i.e.*, feed several foods, feed more) to the mothers of malnourished children, not to discover the best diet in each community. In fact, the same diet has been emerging everywhere from the 24-hour recall of positive-deviant mothers and is already well-known to the monitrices. In our opinion, the use of the positive-deviance approach to “sell” a nutritionally good and economically feasible diet to the mothers has been a very important contributor to the success of the HAS program.

Additional work is needed to understand the impact of the Hearth program. The analysis here does not address the feeding and nutritional impact of the program on other mothers and children in the communities where it is implemented (community effect), nor the extent to which the effects of the program are sustained through time such as might be observed on a mother’s practice with younger siblings. Representative samples drawn from the entire population in the program and comparison communities are probably required to assess the community effect, rather than samples drawn from the program participants only.

Improvements in the program could be designed by evaluating the relative contribution of different components of the program. For example, the contribution of the monitrices and animatrices could be analyzed if a true random sample were drawn rather than a systematic sample such as the one used in this case. An analysis of the relative contribution of the 12-day foyer component of the program and the hospital referral component (for children who do not gain weight after eight weeks) should be made by obtaining data from the eight-week weighings and hospital records. The extent to which the structure of monitrices and volunteer mothers sustains and delivers other services that affect health and development of the children in the community is another issue that requires long-term evaluation.

Finally, it is important to gain a clearer understanding of the interaction between and the relative contributions made by the GMP and the Hearth programs. Does the GMP program really provide follow-up care to the Hearth children? Do the animatrices increase the referrals and effectiveness of the GMP program? Is the Hearth program really more effective for the mildly malnourished, and is the GMP program more effective for the severely malnourished? Furthermore, do these two effects support or interfere with one another when the two programs overlap? These issues are addressed more systematically in the next section.

### **Proposed Monitoring and Evaluation Approach**

No service-oriented organization wants to spend more money on evaluation than is necessary. The approach to evaluation taken by HAS, with its emphasis on impact assessment (*i.e.*, reduction in malnutrition in participants, reduction in mortality in participants and younger siblings) is practical and low-cost. Yet a program manager is equally eager to obtain maximum impact from whatever resources are expended on an intervention. When impact appears to fall short of

what might be possible, concerned managers will seek ways to revise a program to improve its effectiveness as well as question whether the evaluation methodology has resulted in a falsely low impact.

To know where improvements might be made, especially if costs are to be contained, usually requires an evaluation of process elements of the intervention. The complete sequence of program inputs that make up the Hearth intervention are listed in Figure 3-1, with subcomponents of inputs where appropriate. Theoretically at least, each of these elements could be evaluated to determine if it had been carried out optimally, although such extensive evaluation would be costly and impractical. A subset of items relating to potential impact on nutritional status is listed in Figure 3-2, along with potential indicators or measurement methods that could be used to assess them. It will probably not be practical for an evaluation to measure and analyze all of the indicators listed in Figure 3-2. Rather, the evaluator must choose those aspects which seem most likely to bear fruit and/or can be carried out within a limited evaluation budget, and limit the scope of the process evaluation to these alone.

Some of the limitations and lessons associated with the impact evaluation reported above deserve closer inspection in future evaluations. The selection of one year as the duration over which to measure change in nutritional status does not allow us to determine if the moderately and severely malnourished children were in fact rehabilitated, or whether a more substantive improvement in nutritional status was observed at eight weeks than at the end of the year. The possible selection biases noted above also raise a number of uncertainties that should be dealt with in future evaluations. Selection bias associated with the selection of the program and control groups can be handled by more appropriate selection procedures; the selection biases associated with children who actually become program participants can be handled by using a representative sample of all preschoolers in the program communities, rather than just participants.

**Figure 3-1.**  
*Process Components in Hearth Programs*

0. Preprogram routine growth monitoring, monthly or bimonthly by age and risk group	7. Implementation of foyer meal preparation and mother education for 2 weeks <ul style="list-style-type: none"> <li>— monitrice supervision</li> <li>— food preparation</li> <li>— child feeding</li> <li>— child consumption of feedings</li> <li>— recognition of changes in child activity and behavior with improved nutrition</li> </ul>
1. Community mobilization <ul style="list-style-type: none"> <li>— meetings</li> <li>— education</li> <li>— use of quantitative presentations of assessment data (e.g., pie charts of malnourished children in the community)</li> </ul>	8. 4-week and 8-week follow-up weighings <ul style="list-style-type: none"> <li>— participation of foyer children in weighings</li> <li>— counseling of children failing to grow</li> </ul>
2. Volunteer mother recruitment	9. Referral, examination and treatment of foyer children failing to grow at 8 weeks <ul style="list-style-type: none"> <li>— acceptance and implementation of referral</li> <li>— examination, diagnosis of illness and treatment</li> </ul>
3. Selection of families by animatrices <ul style="list-style-type: none"> <li>— families not selected</li> </ul>	10. Post-program routine growth monitoring/weighing and counseling <ul style="list-style-type: none"> <li>— participation of foyer children in weighings</li> <li>— counseling and motivation of mothers whose children did not grow</li> </ul>
4. Volunteer mother training <ul style="list-style-type: none"> <li>— growth chart education and understanding</li> <li>— 24-hour dietary survey of positive-deviant children</li> <li>— menu preparation, education and understanding</li> <li>— market buying exercise</li> </ul>	11. 1-year follow-up weighing of foyer children <ul style="list-style-type: none"> <li>— participation of foyer children in weighing</li> </ul>
5. U5s weighing and recruitment of malnourished for foyers <ul style="list-style-type: none"> <li>— recruitment of 100% of U5s for weighing</li> <li>— recruitment of moderately and severely malnourished to foyers</li> <li>— enrollment of mildly malnourished in foyers</li> </ul>	12. Income-generation activities for mother of child who had not grown at 1-year follow-up <ul style="list-style-type: none"> <li>— participation of mothers in IG activity</li> <li>— education of mothers during IG activity</li> <li>— post-IG activity implementation of new economic activities by participating mothers</li> </ul>
6. Community education; preparation for foyers <ul style="list-style-type: none"> <li>— education of mothers (and community leaders if appropriate) about purpose and methods of foyers</li> <li>— motivation of mothers of malnourished U5s to participate in foyers</li> <li>— obtain commitment by participating mothers</li> </ul>	

### Impact Assessment Recommendations

With these factors in mind, we would recommend consideration of the following points in planning future Hearth program evaluations.

## Hearth Model

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*Assess total child population.* By confining monitoring of changes to only the malnourished children, the potential of the intervention to influence community behavior beyond the participants (community effect) and to change the proportion of malnourished children in the whole population cannot be determined. As a public health measure, the impact on the whole population is of interest, not just the impact on the “sick” children (the malnourished ones). Furthermore, samples that

**Figure 3-2.**

*Potential Factors Leading to Improved Nutritional Status Following Hearth Programs*



## Hearth Model

Factor	Indicator/Measurement (P) = process, (O) = outcome, (I) = impact
1. Food/nutrient intake during the 12 meals of the foyer.	<ul style="list-style-type: none"> <li>— Daily observation of actual compared to theoretical intake in a sample of participating children. (P)</li> <li>— Change in rate of weight gain at 0 &amp; 4 weeks vs. 4 &amp; 8 weeks. (I)</li> </ul>
2. New mother knowledge on components and frequency of diet.	<ul style="list-style-type: none"> <li>— Mother knowledge regarding diet as measured in pre- and post-foyer interview (survey). (O)</li> </ul>
3. Acceptance and routine practice of new diet ( <i>i.e.</i> , change in diet) following the foyer: <ul style="list-style-type: none"> <li>— new items (macronutrients and micronutrients).</li> <li>— new volume and/or density.</li> <li>— new frequency (extra meal daily?).</li> <li>— change in breastfeeding practice.</li> </ul>	<ul style="list-style-type: none"> <li>— Survey mothers, 24-hour recall of child's diet. (O) (<i>Unlikely to be valid measure of actual diet in Haitian environment.</i>)</li> <li>— Rapid ethnographic assessment method involving observation of feeding in household. (O)</li> <li>— Interview with neighbor, sister, etc., who is likely to know about mother's feeding practice. (O)</li> </ul>
4. More attention by mother to the index child because: <ul style="list-style-type: none"> <li>— foyer and follow-up weighings force her to perform.</li> <li>— child is more demanding and energetic after foyer.</li> </ul>	<ul style="list-style-type: none"> <li>— Anthropologic observation before and after foyer. (O)</li> <li>— Interview with mother. (O) (<i>Not likely to be valid.</i>)</li> </ul>
5. Child more energetic, aggressive and thereby successful at getting more food.	<ul style="list-style-type: none"> <li>— Structured observations of children at beginning and end of program, in the foyer and at home using prevalidated ratings of child activity, food-demanding behavior and parental manipulation. (I)</li> </ul>
6. Child fed by a different person ( <i>e.g.</i> , by mother instead of older child) or other change in how child is fed.	<ul style="list-style-type: none"> <li>— Interview with mother. (O) (<i>Possible validity problems.</i>)</li> <li>— Observations in home. (O)</li> <li>— Interview with neighbor. (O)</li> </ul>
7. Force feeding, giving child more than it wants, so child achieves desired weight gain. ( <i>Unlikely in Haitian culture.</i> )	<ul style="list-style-type: none"> <li>— Observations in home. (O)</li> </ul>
8. More money spent on food after program than before.	<ul style="list-style-type: none"> <li>— Interview mothers or fathers (survey). (O)</li> </ul>
9. Animatrice continues to monitor the mothers and encourages them to give the better foyer diet or increase frequency.	<ul style="list-style-type: none"> <li>— Interview mothers, neighbors or animatrice regarding visits or contacts with animatrice. (P)</li> </ul>
10. Pressure on the mother or family by a village leader or by one or more neighbors (other than the animatrice).	<ul style="list-style-type: none"> <li>— Interview mothers. (P)</li> <li>— Interview village leaders. (P)</li> <li>— Long-term anthropological observation in village. (P)</li> </ul>

**Figure 3-2.**  
*Potential Factors Leading to Improved Nutritional Status Following Hearth Programs (cont.)*

Factor	Indicator/Measurement (P) = process, (O) = outcome, (I) = impact
11. Deworming.	<ul style="list-style-type: none"> <li>— Observe weighing to see percentage receiving deworming medication. (P)</li> <li>— Prospective study of nutritional improvement in dewormed group and nondewormed comparison group. (I)</li> </ul>
12. Care given at dispensary for illness occurring during program.	<ul style="list-style-type: none"> <li>— Study diagnoses and treatments of program children visiting dispensaries during and after program, for index cases. (P)</li> <li>— Study effect of dispensary access by Hearth program participants on their nutritional improvement. (I)</li> </ul>
13. Care following referral to HAS because of failure to grow as measured at 8-week weighing (e.g., TB treatment).	<ul style="list-style-type: none"> <li>— Study diagnosis, treatment and outcome of cases referred, with in-home review of referrals without a clear causative diagnosis. (P)</li> </ul>
14. Weighing of child at 4 and 8 weeks following the foyer as a continuing psychological pressure/stimulus to the mother, creating the feeling that someone is paying attention to her.	<ul style="list-style-type: none"> <li>— Assess participation at 4- and 8-week weighings, and the counseling given during these weighings. (P)</li> <li>— Prospective study of effect of follow-up hospital visit following low 8-week weight comparing those who visited and did not visit. (I)</li> </ul>
15. Agents increase the amount and/or effectiveness of their participation in GMP due to the foyers and continuing presence and involvement of animatrices in the community.	<ul style="list-style-type: none"> <li>— Attendance at subsequent routine weighings. (P)</li> <li>— Observe activities at routine weighings, and assess relative effort put on counseling mother vs. merely weighing. (P) (<i>Weighing only assumed to have minimal effect on behavior.</i>)</li> <li>— Analyze nutritional progress as a function of attendance. (I)</li> <li>— Assess referrals for medical care. (O)</li> </ul>
16. For those malnourished children whose mothers are animatrices, the various stimuli from the program may lead the mother/animatrice to keep her child well-fed.	<ul style="list-style-type: none"> <li>— Determine proportion of foyer cases with animatrice mother. (P)</li> <li>— Analyze nutritional progress of animatrice children vs. children with nonanimatrice mothers. (I)</li> </ul>

are representative of the entire preschool population avoid several of the selection biases and other threats noted above.

**Use a prospective control.** Identify the malnourished cohort in both intervention and control populations with a prospective 100% weighing, not the retrospective selection of those children who had voluntarily participated in weighings a year previously. To facilitate agreement to participate as a control group, a community can be promised participation in the program the following year. Ethical considerations require that corrective action be taken for children found to be sick or severely malnourished; therefore, careful thought needs to be given to maintaining the integrity of the evaluation design without compromising ethical standards.

**Determine impact on wasting and stunting.** While admittedly being cumbersome and expensive, measurement of height at the same time as weight would allow determination of the impact of the program on both wasting and stunting, as well as a more precise assessment of the nutritional status of the population at the beginning and end of the program. Given the importance of height and stunting on future work productivity (shorter workers are less productive), height information helps to determine the economic benefit from the intervention.

**Assess impact at intermediate points.** To help differentiate the immediate impact of the foyers on the child's nutritional status versus the longer-term impact based on "permanent" improvements in the mother's feeding behaviors (or illness case management), measurement of weight in both intervention and control cohorts at 0, 4 and 8 weeks and 1 year would be useful.

**Disentangle impact of program components.** The program includes several distinct components that are likely to contribute substantially to the nutritional impact of the program in the short or long term, including: deworming, the two-week feeding foyers and the referrals to the hospital of eight-week failures. These components have different costs and may have different effects on different types of children. The different contributions of deworming and feeding could be obtained with a 2x2 design (with and without deworming, with and without feeding), while the effect of the hospital referral component could be efficiently studied by identifying the children who were referred.

**Assess interactive impact of GMP and Hearth.** The interaction of GMP and Hearth may be the key to understanding the real potential of the Hearth program. A 2x2 design can provide this understanding, where one study group includes both GMP and Hearth, one includes GMP only, one includes Hearth only and one includes neither.

**Improve the validity of sibling assessment.** Despite an unavoidable tendency of the younger siblings of an "outlier" malnourished child to range closer to normality than their older siblings because of the statistical principle of "regression toward the mean," assessment of sibling growth as a measure of maternal behavioral changes is conceptually sound. A valid control group of malnourished children and their siblings must be used (see above), however, and the sample must be large enough to allow matching of the ages of both the index and control malnourished children, and the younger siblings of each, since both nutritional status and mortality rates differ widely by age. Ideally, one would use a total population sample, and not just malnourished children, to allow comparison of changing results in the siblings of nonmalnourished children as well.

### **Process Assessment Recommendations**

*Assess differences among animatrices and among monitrices.* Much of the success of this intervention depends on the effectiveness of the animatrices in soliciting participation of mothers and children, in convincing the malnourished to participate in the foyers, in providing a diet that the children will eat enthusiastically. We observed dramatic differences in the food prepared by different animatrices and corresponding differences in the eagerness of the children to eat the different foods. A crucial part of their effectiveness also means that they do home follow-ups to ensure daily participation of the selected children, get mothers to take part in the four-week and eight-week weighings as well as in subsequent routine growth monitoring sessions and that they continue to provide input to the participating mothers after the 12 daily feedings are completed. For this reason, collection of data on differences in animatrice performance, and linking impact differences with those performance differences, is likely to pay off in understanding the reasons for failures and successes among the overall cohort of malnourished children. Given the potential importance of monitrice supervision and continuing inputs on animatrice performance, it may be of interest to attempt to assess the extent and quality of monitrice inputs as well, and contrast results in the areas trained and managed by different monitrices. Additionally, in-depth interviews with animatrices and monitrices to assess their perspectives and motivation would provide valuable insight into the reasons for differences.

*Assess other potentially important process indicators.* Program implementors are usually aware of aspects of implementation where differences between families or villages, between program personnel, between seasons or between other factors exist with the potential to play an important role in ultimate outcomes and impacts of the interventions. An evaluation program aimed at improving the effectiveness of the program will aggressively seek to identify the aspects that appear to be most important, as well as objectively monitor differences that are taking place that might be reduced to improve the success of the program. Development of indicators from the list of program elements in Figure 3-1, or use of some of those mentioned in Figure 3-2, may be carried out during pilot efforts and early in the large-scale intervention to prepare a suitable checklist of such process observations to be made in particular localities. The results of these observations can then be correlated with outcome and impact measurements to identify where improvements in the process elements may have the greatest impact on program success.

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### **Acknowledgments**

The HAS Hearth program is the latest development in a long-term effort by Gretchen and Warren Berggren to find practical solutions to the difficult problems related to malnutrition and child survival and development in Haiti, as well as other developing countries. This activity was supported by Hôpital Albert Schweitzer and by the BASICS Project/Partnership for Child Health, Arlington, Virginia, where the authors work. World Relief Corporation and its staff, especially Arnie Bergstrom, Muriel Elmer and Olga Wollinka, were instrumental in conceiving and organizing the effort. The work, support and hospitality of the Hôpital Albert Schweitzer were vital to the evaluation. Valuable technical advice and assistance was received from Laura Caulfield, Faisal Faruque and Dory Storms of The Johns Hopkins University, and Jay Ross of the Academy for Educational Development. The work of Jeff Grant was vital to the conduct of the evaluation, and he and Warren Berggren are equal contributors with the authors to the conception and implementation of the evaluation, although they are not responsible for this report. Although these friends and

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colleagues have been vital to the conduct and success of the work reflected in this paper, any misinterpretations, errors or other problems with this report are the sole responsibility of the authors.

# Chapter 4

## Nutritional Education and Rehabilitation Program: A Save the Children Project in Vietnam

*Gretchen G. Berggren*

Jerry and Monique Sternin of Save the Children Foundation (SCF) in Vietnam are involved in developing a Hearth program in that country, using background from Nutrition Demonstration Foyer (NDF) programs in Haiti and a preliminary Hearth program that SCF implemented in Bangladesh. SCF's Hearth program in Bangladesh focused on weaning foods and on helping mothers to produce weaning foods as well as on increasing the frequency of daily meals for their children. Using Marian Zeitlin and colleagues' research on positive-deviance (1990), the Hearth program in Vietnam added a component in which mothers of malnourished children learned about the feeding practices of mothers in their own community who were as impoverished as they, but whose children were better nourished. Surprisingly, these positive-deviant mothers were to be found in every community, underscoring the fact that variations exist even in a highly politically organized society.

The Vietnam Hearth program, referred to as NERP (Nutritional Education and Rehabilitation Program), is part of the Poverty Alleviation and Nutrition Program (PANP), which was implemented by SCF in four communes in the Thanh Hoá province from 1991 to 1995. Using existing social infrastructure, community health volunteers (CHVs) were trained to perform a baseline census, make rosters of all children under-3 years of age and conduct growth monitoring and promotion (GMP) sessions. They were also trained to perform positive-deviance studies, deworm children, see that they were immunized and getting vitamin A and iron supplementation and supervise the NERP sessions for seriously malnourished children. These functions were carried out under the supervision of the local health authorities and in concert with the activities of the health centers in each of the communes.

The program's mission was to enhance, measurably and sustainably, the quality of life of women, children and their families through a commune-level development program that could be widely replicated. The approach to program design was determined by the need to make an immediate impact on malnutrition, *before* waiting for other causal factors to be addressed, such as water supply, sanitation and structural poverty.

### Program History

The program was implemented in 1991 in four pilot communes in Thanh Hoá province. It was later expanded to 10 additional communes and used Vietnamese staff. SCF's figures show that 3092 children were rehabilitated from second- or third-degree malnutrition to first-degree or

normal nutritional status between March 1991 and September 1994. The program is currently expanding into eight additional provinces with a total population of 500,000 people. To meet the demand of this expansion, SCF has turned some of the NERPs into “living universities,” where the government and other organizations can send people for training.

## Program Components

### **Growth Monitoring and Promotion (GMP) Program**

CHVs weigh all children under 3 years every two months and counsel mothers regarding their children’s nutritional status. Mothers whose children are doing well are encouraged to continue the good feeding practices. Children at risk, those suffering from second- and third-degree malnutrition, are identified and immediately enrolled in a NERP. Vitamin A and iron supplements are distributed to all.

### **Nutrition Education and Rehabilitation Program (NERP)**

The NERPs have two objectives: (1) to rehabilitate moderately and severely malnourished children, and (2) to enable parents to sustain enhanced nutritional status after rehabilitation. The program is based on a community-implemented positive-deviance study. The methodology consists of a two-week session each month, where CHVs teach basic nutrition and hygiene and provide nutritious, calorie-dense meals to the children. The mothers of participating children are required to bring a daily contribution of food as the price of admission to the program. Children who do not gain weight during the NERP are invited to a second or even a third cycle, by which time a lot of attention is focused on them and they also may be referred to the local health center for diagnosis and treatment of underlying illness. The program emphasis is on generating community-wide behavioral changes by demonstrating the effects of good nutritional practices on the entire community. Commune leaders, when interviewed, proudly display pie charts showing the disappearance of malnutrition in their commune.

### **Nutrition Revolving Loan Fund (NRLF)**

The families of children who fail to “graduate” after two NERPs are provided revolving loans in the form of laying hens (or other sources of daily income and food). These families are required to give at least five eggs each week to their malnourished children. Loan repayments allow other families with malnourished children to gain access to loans.

### **Healthy Pregnancy and New Mother Program (HPNMP)**

The program uses a proactive approach by addressing the problem of malnutrition before birth. It includes iron supplementation. The objective is to promote healthy pregnancies and safe deliveries, as well as decrease the incidence of low-birthweight babies. The postnatal health of mothers and babies is promoted to ensure a “healthy head start.” This component supports the Ministry of Health’s mother and child health program. These prenatal and postnatal activities are

carried out through pregnancy monitoring and home visits by CHVs who encourage mothers to go to government-run health centers on a regular basis.

## Steps in Establishing PANP

The first task was to identify and recruit one or more CHVs for each hamlet within a commune. The selected CHVs received training in family registration, growth monitoring and promotion and the health information system. This key cadre also received incremental training in health, nutrition and management over the two-year program implementation cycle. The hamlets' nutritional status was surveyed using scatter graphs of weight-for-age to identify all well-nourished and all malnourished children. Each mother was then given a Road-to-Health card to bring to future weighings.

A small team of hamlet representatives was selected to make home visits to positive-deviant families—that is, poor families with well-nourished children—to identify food variety, frequency of meals, use of snacks, care of children and other health-seeking behaviors. Once this information was collected, the CHVs established the menus using readily available, low-cost or free positive-deviant foods under the direction of the program staff and/or local workers from the health center. Snack foods were also identified as an important part of the diet.

The next step was to identify people willing to volunteer their homes as NERP centers, one per hamlet, to which the CHVs invited mothers or caretakers of second- and third-degree malnourished children for a two-week, daily NERP session.

## NERP Protocol

The mothers or caretakers bring children to a home or NERP center with a small contribution of food as the price of admission. The mothers are required to wash their children's hands and faces as a reinforcement of hygiene messages and to establish desirable habits. The mothers then help cook the food and feed their children together. The daily repetition of the "extra meal" and snack continues for two weeks, after which time the mothers are expected to continue this feeding practice on their own for two weeks. Daily nutrition and hygiene messages based on UNICEF's "Facts for Life: A Communication Challenge" (undated), as well as positive-deviant foods, are discussed with the mothers or caretakers.

The children are weighed by the CHVs on the last day of the NERP, and children who are not growing are invited to a subsequent NERP session. The mothers or caretakers whose children have "graduated," that is, who have reached normal nutrition or first-degree malnutrition, are congratulated by the CHVs. These children are referred to nearby health centers for follow-up. The mothers whose children are not growing are a special focus for income-generation projects.

The communes continue the NERPs until only two to three children per hamlet remain second- or third-degree malnourished. Generally, this means that the number of such malnourished children in

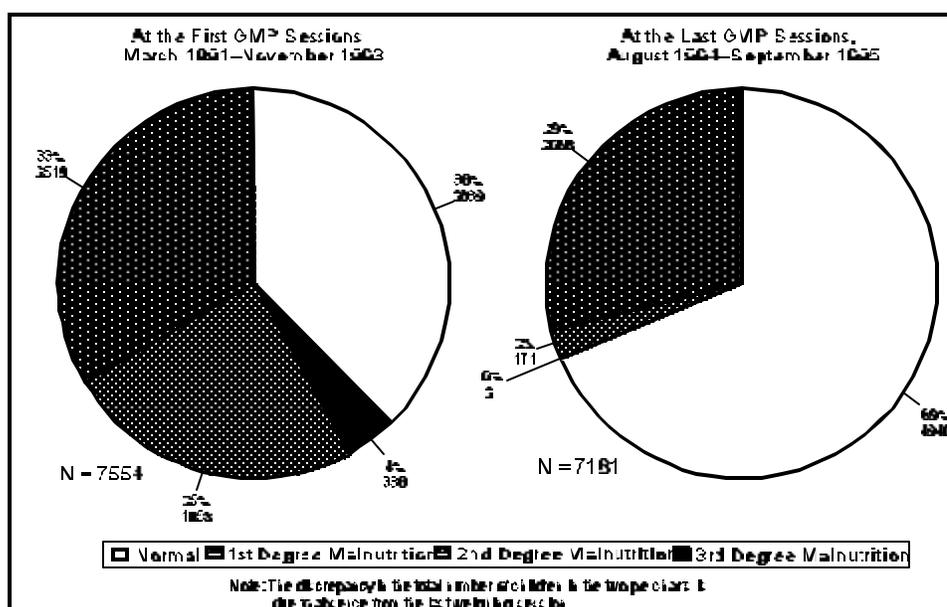
the commune drops to between 4% and 5%. The remaining second- or third-degree malnourished children are followed by the CHVs through home visits.

## Conclusion

NERPs have succeeded significantly in decreasing malnutrition on a community-wide basis in U3 children, while introducing a model that can be widely replicated. This claim is supported by an independent survey carried out by the Vietnam National Institute of Nutrition in October 1995, which showed a 40% reduction in overall malnutrition and 68% reduction in severe and very severe malnutrition in the NERP intervention area as compared with a demographically similar one nearby where this intervention had not taken place (Figures 4-1 and 4-2).

The program has demonstrated that the NERPs can improve the nutritional status of malnourished children using local resources, even if other desirable improvements in social indicators have not occurred. It is evident from the success of the program that participatory adult training methods are effective and sustainable in reducing and preventing malnutrition. In Quang Trung, where the program was phased in more than two years ago, children now aged under-36 months have been found to have approximately the same reduced rate of second- and third-degree malnutrition as do their 36- to 59-months old siblings (0-36 months, 4.8%; 33-59 months, 5.3%). This finding testifies to the fact that the program has been sustainable.

In addition, the program has shown that income-generating lending programs can be effectively and acceptably targeted to neediest mothers by using nutritional status of children as a primary criterion. This fact is borne out by SCF data collected in September 1995 from 1797 families of second-degree malnourished children whose families had received loans. Sixty percent of the children in these families achieved normal nutritional status, and 37% achieved first-degree



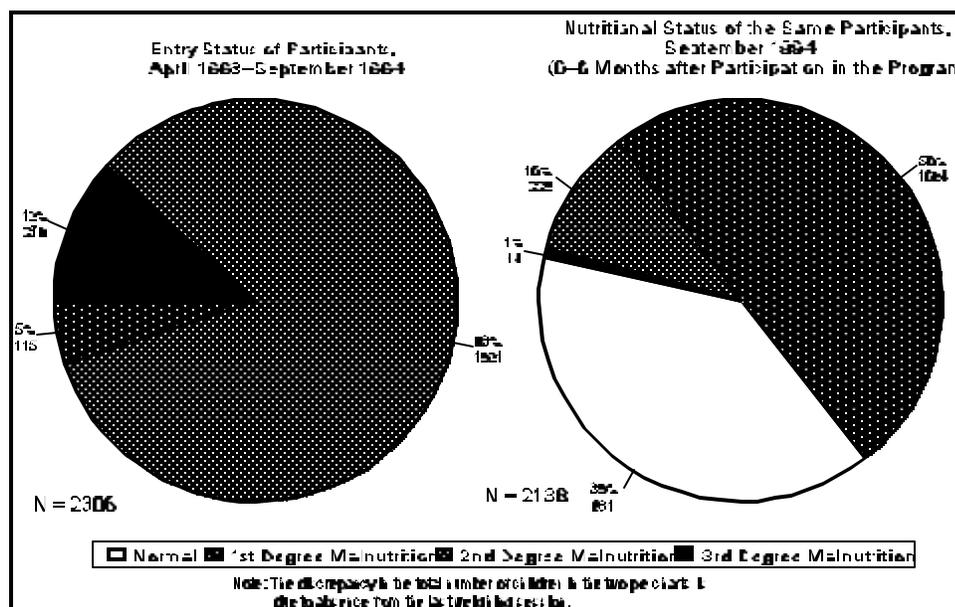
malnutrition status within one year of receipt of the loan.

**Figure 4-1.**

*Community-Wide Nutritional Status of Children Under-3 Years Old from Survey at Beginning of Program in 14 Communes Compared to Nutritional Status at Most Recent Survey*

**Figure 4-2.**

*Nutritional Status of All Children Participating in NERP: 10 Expansion Communes, Thanh Hoá Province*



Increasingly, health workers have learned that their training of health volunteers can effectively support mothers in preventing malnutrition, obtaining prenatal care, improving nutrition during pregnancy, increasing rest during the last trimester and adopting better breastfeeding practices.

By providing an evolving model, a training methodology and curriculum materials for community-based nutrition education for rural areas, the NERPs can become useful reference sources at the district, provincial and national levels as well as for universities, medical schools and other related institutions. NERPs also provide excellent “field laboratory” opportunities for the study of community health methods and for prospective longitudinal studies.

As a spillover impact, the program has fostered integration of primary health care services with activities of commune leaders and women’s unions, and with the health center staff at the commune level. At the village level, it has fostered integration of its growth monitoring activities with other vertical programs, such as the expanded program on immunization, the acute respiratory infection and Control of Diarrheal Diseases initiatives, vitamin A and iron supplementation, deworming and family planning.



# Chapter 5

## Rapid, Sustained Childhood Malnutrition Alleviation through a Positive-Deviance Approach in Rural Vietnam: Preliminary Findings

*Monique Sternin, Jerry Sternin and David L. Marsh*

### Summary

Programs attacking root causes of multifactorial childhood malnutrition may show impact, but only in the long term. Positive-deviance strategies may circumvent the delay.

Save the Children Foundation (SCF) implemented a two-year Poverty Alleviation and Nutrition Program (PANP) from 1993 to 1995 in four communes with a population of 26,057, in Vietnam's Thanh Hoá province. Using existing social infrastructure, we trained health volunteers to perform a baseline census, make rosters of all children under age 3 years (U3s), conduct growth monitoring and promotion (GMP) sessions, perform positive deviance studies, deworm children and supervise Nutritional Education and Rehabilitation Programs (NERPs) for seriously malnourished children. Positive-deviance studies identified behaviors among poor families likely to explain their children's good nutrition, such as feeding them paddy shellfish and greens. This information guided NERP education. We used weight-for-age and international reference standards.

Overall weight-for-age of 1893 U3s improved 0.36 Z-scores (from -2.14 to -1.78,  $p < 0.001$ ) without sex difference. Those who were severely malnourished ( $< -3 Z$ ) improved 1.44 Z-scores (from -3.58 to -2.14,  $p < 0.001$ ). The prevalence of severe malnutrition decreased from 23% to 6% ( $p < 0.001$ ); the prevalence of normal weight-for-age increased from 42% to 56% ( $p < 0.001$ ). Children between 18 and 23 months at baseline ( $n = 244$ ) improved their weight-for-age (mean Z-score: -2.475 at baseline vs. -1.844 after year one,  $p < 0.001$ ) and maintained the improvement after graduating from the program. The weight-for-age of children born during program year two after NERPs had ceased was the same as or better than counterparts born during year one.

Local solutions alleviated childhood malnutrition significantly, rapidly and sustainably amid settings of generalized poverty. Up to 12 deaths may have been averted. While Vietnam may be a positive-deviant nation among developing countries, the approach deserves wide consideration.

### Introduction

Demonstration development programs pique curiosity and sometimes point the way forward. Useful development programs, on the other hand, show impact that can be measured, sustained and replicated at affordable costs (Sternin and Choo 1996). Many childhood malnutrition projects

do not meet these criteria. Recent evidence highlights an association between all degrees of malnutrition and childhood mortality (Pelletier, Fongilla and Habicht 1994; Pelletier et al.1993; 1995). Poor countries need better strategies to respond to their malnourished children.

Feeding programs do improve childhood nutrition (Berg 1987), but the effects are usually temporary (Beason and Ghassemi 1982). Conventional wisdom asserts that malnutrition is the result of multiple factors—a complex interactions of biomedical, behavioral, economic, cultural and political determinants. Schemes intended to rehabilitate malnourished children and maintain this rehabilitation often rest on thoughtful, long-term programs attacking root causes. Such sound social strategies, given sustained political will, may bear fruit for today’s children’s children. What can be done now?

Vietnam, with its 75 million population, confronts such a dilemma. While its evolution to a market economy, beginning in 1986, has generally raised living standards, rural subpopulations experience increased vulnerability owing to the cessation of the Commune Agricultural Collective Farm’s wealth redistribution and the privatization of health care (Berggren and Tuan 1995). Vietnam has the highest prevalence (52%) of moderately or severely underweight children in the region despite a relatively low U5 mortality rate, 48/1000 (UNICEF 1995). The National Institute of Nutrition (NIN) of Vietnam reports that 45% of the U5s are malnourished (NIN Survey as quoted in Berggren and Tuan 1995). Viewed another way, however, 55% of them, countless of whom live in poor families, are *not* malnourished.

Strategically, a positive-deviance study asks: how do some poor families have well-nourished children when their neighbors do not? That is, what is their “deviant” behavior (Zeitlin et al. 1990)? The development tool rests on the epidemiological 2x2 table that categorizes a group of individuals according to the presence or absence of two phenomena that are epidemiologically associated and relevant to the community, such as “well-nourished child” (yes/no) and “household impoverishment” (yes/no). Positive-deviants, such as a poor family with a well-nourished child, attract the analyst’s attention because they contradict the general association. A negative-deviant (Shekar, Habicht and Latham 1991) is a relatively wealthy family with a malnourished child. “Positive” and “negative” refer to social, rather than numerical, values.

Positive-deviance is well-suited to communities where a problem is common, recognized, important and remediable through behavior modeled within community norms. The process galvanizes households at risk in poor communities to quickly identify and adopt affordable, lasting solutions to vexing problems from their own impoverished neighbors’ experiences. In early 1990, the Government of Vietnam invited Save the Children Foundation (SCF) to create a national community development model focusing on populations left behind by the rising economic tide. This preliminary report summarizes some of SCF’s early experience with its Poverty Alleviation and Nutrition Program (PANP) to enable families to improve and sustain their children’s nutritional status after rehabilitation.

## Methods

## Setting

SCF introduced PANP in the coastal and lowland delta areas of Thanh Hoá province (population three million). One of the country's poorest provinces, Thanh Hoá is approximately 150 kilometers south of Hanoi, a four-hour drive on the main north–south national highway. Inhabitants are primarily subsistence and cash-crop rice farmers who received small parcels of land after agricultural decollectivization. Moderate “hungry seasons” (April–June and September–October) precede each of two rice harvests. Literacy is high among most groups. Women and men work in the fields. Women are entitled to a monthly “menstruation day” and a three-month postpartum leave, but they generally work throughout pregnancy. Elderly women and older siblings typically rear young children. Currently, poor rural families expect to educate two children, leaving two to work the land.

SCF implemented PANP between November 1993 and November 1995, targeting four communes (total population 26,057) in Tin Gia District because of high levels of childhood malnutrition and supportive commune leadership. The extensive social infrastructure included a people's committee, a women's union, a health committee and a farmers' committee, among others. The health system included a brigade “nurse” for each hamlet, a commune health center (CHC) staffed by a pharmacist, a “doctor” and a midwife and/or nurse and a geographically accessible hospital.

## Intervention

National political concern for childhood nutrition facilitated community entry, which, in turn, took advantage of existing organizations and systems. The chairman of the people's committee (equivalent to a mayor) headed the PANP commune steering committee (CSC), other members of which were the chair or vice chair of the women's union, a health committee member and an accountant. Aided by public address systems reaching all hamlet inhabitants, CSCs mobilized community members for PANP.

The first task was to identify one or more community health volunteers (CHVs) for each hamlet from the women's union members. This key cadre received health, nutrition and management training, practice and review incrementally over the two-year program implementation cycle. They also received a small stipend initially provided externally, and later paid through the commune endowment fund. Each CHV conducted a census of her families (between approximately 80 and 100) from which she made rosters of all U3 children. Then, CHVs conducted the first every-other-month Growth Monitoring Program (GMP-1) in which they weighed all U3s, introduced or reinforced healthful child care behavior and referred to CHC all very severely malnourished children for medical evaluation. The CSC initiated every-six-month deworming of children age 6 to 36 months in January 1994. GMP-7 and GMP-13, at the completion of 12 and 24 months, targeted all children under age 4 and 5 years, respectively, to assess the status of those who had graduated from the program at age 3 years.

The positive-deviance study comprised the third element of the situation analysis, along with census and GMP. SCF staff trained a small team of hamlet representatives from the people's committee, women's union members and health staff in the concepts and methods of the positive-

## Hearth Model

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deviant approach. Each team constructed a list of questions pertinent to the context, including types of foods given, hand-washing practices, snack offering practices and so on.

From the CHV's GMP-1 findings and the public "wealth ranking," which was based on rice production, the team selected, visited and gathered information about feeding practices, child care and health care among four very poor families with a normally nourished child and two wealthy families with a severely or very severely malnourished child. By consensus, the team identified the

likely explanations for the deviant behavior resulting in normal nutritional status despite family poverty. Observations from positive-deviant children formed the practical basis of the community's response to its problem—that is, more nutritious, readily available, inexpensive or free foods and feeding practices through its NERP. Observations from negative-deviant children underscored a key attitude: Health does not require wealth.

As long as was needed—in this case, through July 1994—each CHV conducted a monthly NERP session for 12 days over a period of two weeks in her hamlet to enable families to (a) rehabilitate and (b) independently sustain and improve the enhanced nutritional status for each severely and very severely malnourished child at home. In the spirit of “learning by doing,” mothers/caretakers were admitted only if they brought a handful of positive-deviant foods each day, such as paddy shellfish and greens—all abundant in the paddies.

NERP sessions taught hygiene, nutrition and the preparation and feeding of calorie-dense meals made from locally available, affordable foods, especially those positive-deviant foods brought by participants. Participants actively learned six key “Facts For Life” (UNICEF et al. 1993) messages. Each affected child received an extra daily meal, prepared by a participant in rotation, on each of the 12 NERP days. The CHV forbade participants to take this food home; the child had to consume it in the NERP session.

In addition to mothers' contributions, the CSC bought and provided fat, rice and eggs or tofu, and monitored serving size and consumption. CHVs weighed participating children at entry and completion of each NERP and reviewed their progress with the mothers/caretakers at the midpoint and completion of each NERP. The CSC discontinued the NERP when the level of severe and very severe malnutrition mitigated against further group rehabilitation, usually at a level of less than 4% to 7% of the U3 population. Thereafter, CHVs followed remaining children individually.

Families of children who failed to rehabilitate after two or more NERPs were eligible for the Nutritional Revolving Loan Fund (NRLF). These families received 10 laying hens, which on average produce 90 eggs a month, of which 20 had to be fed to the child, 20 sold to repay the loan (US\$15) over two years and the remaining 50 supplemented the family's well-being as the family saw fit.

Program staff and community partners fully informed all potential participants about each phase of PANP intervention, and the right to decline participation was respected. Program staff weighed ill children at home and referred those who were seriously ill or very severely malnourished. Confidentiality was not a community value.

### **Measurements and Information System**

Baseline census data were obtained for each family member (*i.e.*, those eating together): district, commune, hamlet, household number, couple, family number, relationship to head of household, date of birth and sex. The census data were computerized, allowing printouts of HV rosters of children eligible for each GMP. CHVs weighed children on a UNICEF-approved, locally made Seca 25 kg (0.1 kg interval) infant scale, calibrated between each weighing. At each GMP,

CHVs plotted weight-for-age on mothers' national combined sex Road-to-Health cards displaying four growth channels: A (normal)  $\geq -2$  standard deviations (SD) below reference median weight-for-age; B (moderate malnutrition)  $< -2$  and  $\geq -3$  SD; C (severe malnutrition)  $< -3$  and  $\geq -4$  SD; and D (very severe malnutrition)  $< -4$  SD.

The CHV also recorded weights and nutritional category in her roster and on the computer printout for data transfer to the computerized database. She summarized the status of her hamlet. Decisions based on the CHV's updated rosters included: referral for health assessment, NERP or NRLF; mobilization for GMP; home visit and vital events. She similarly processed NERP statistics, including attendance, weights, change, rehabilitation status and eligibility for loans. The CSC reviewed all hamlet summaries, comparing performance among hamlets, and collated and aggregated the commune's data, which were plotted on a prominently displayed demographic and nutritional wall chart in the people's committee headquarters at the CHC. CSCs likewise forwarded their summaries to district and provincial partners. CHVs tracked vital events through attendance at GMP and household visits.

### Supervision and Quality Control

All team members received training in conducting meetings, accounting and supervisory skills. The training team and the district steering committee, which consisted of the people's committee chair or vice chair, women's union head or vice head, a representative from the district health department, Communist Party secretary and an accountant, supervised the GMP. The CSC and hamlet leaders supervised the NERP, and the women's union supervised the NRLF. The computerized database allowed monitoring of each CHV's nutritional status assessments.

### Analysis

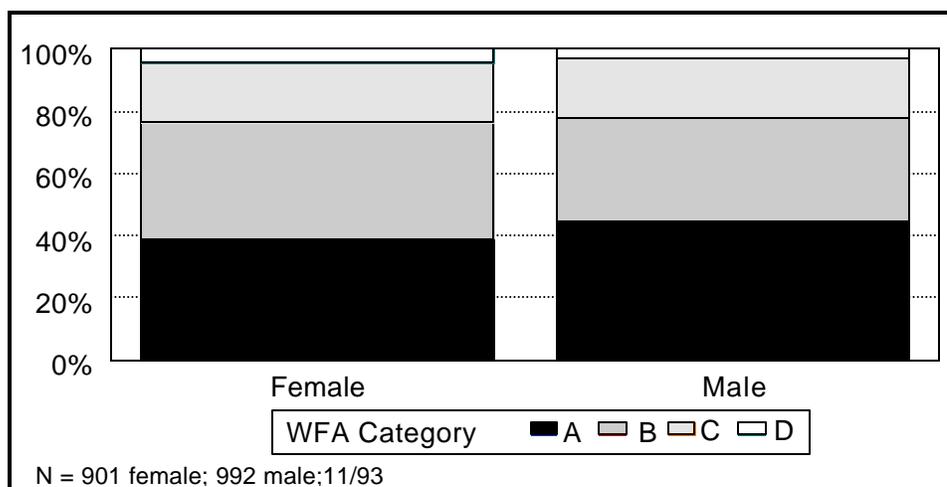
We analyzed anthropometric data cross-sectionally (all U3s presenting to a given GMP) and longitudinally (tracking participants over two years from GMP-1 through GMP-13). Since some children were lost in the follow-up, we applied the average known outcome distribution of each baseline nutritional group pro rata to the missing children according to their baseline status to better estimate the outcome for the entire group. We analyzed weight-for-age Z-scores (WAZ), based on international reference standards (National Center for Health Statistics), as both categorical and continuous variables. We excluded individuals with WAZ scores  $< -6.000$  or  $> +6.000$ . Z-scores (also known as standard-deviation units) are increasingly the preferred unit of expression for pediatric anthropometry (Boss, Toole and Yip 1994; CDC 1992; WHO 1986).

Data were managed in Fox-Pro, version 2.5, and analyzed in Epi Info, version 6 (Dean et al. 1994). We used chi-square statistics to compare proportions, Student's t-test or Kruskal-Wallis test for data not normally distributed to compare means, and F-test to compare two continuous variables. P-values greater than 5% were considered to be due to chance and statistically not significant (NS). Confidence intervals (CIs) were calculated when appropriate.

## Results

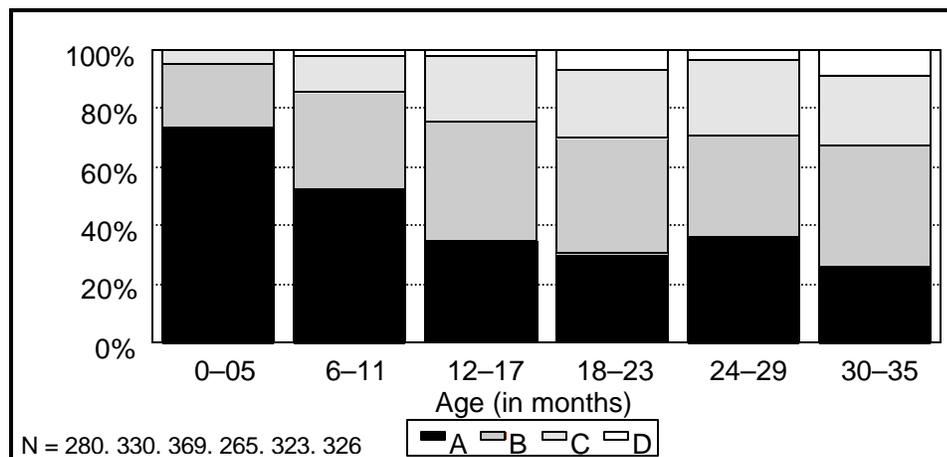
Sixty HVs implemented PANP in the 52 hamlets in the four communes. The first growth monitoring session (GMP-1) weighed 2015 children, of whom 1899 were less than age 36 months,

**Figure 5-1.**  
*Baseline Nutritional Status: Weight-for-Age by Sex*

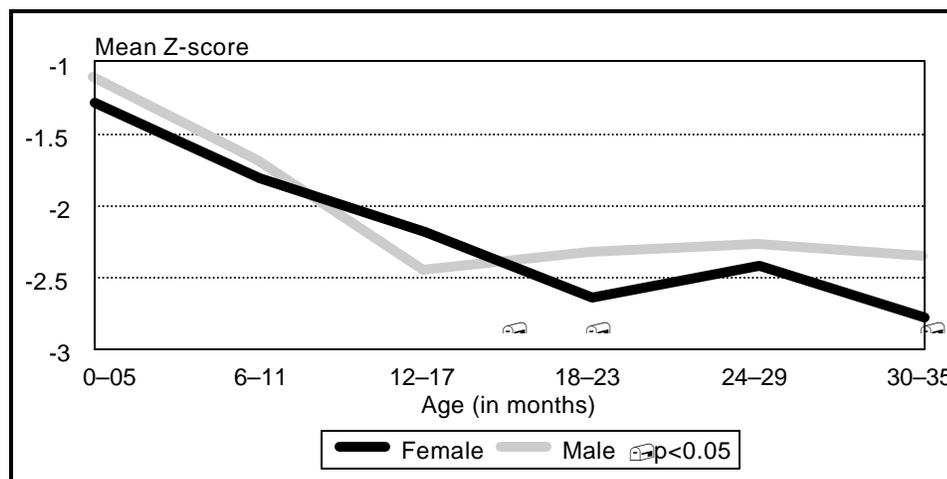


of whom 1893 (99.7%) had WAZ values within acceptable limits. Figure 5-1 shows that boys were better nourished than girls at baseline (prevalence in category A: 442/992 [44.6%] boys vs. 349/901 [38.1%] girls,  $p = 0.01$ ; and mean Z-score: -2.22 for girls vs. -2.05 for boys,  $p = 0.003$ ). Both sexes experienced similar prevalence of severe ( $< -3Z$ ) malnutrition (220/992 [22.2%] boys vs. 214/901 [23.8%] girls,  $p = \text{NS}$ ). As shown in Figure 5-2, baseline nutritional status worsened with increasing age at baseline (chi-square for linear trend by 6-month age interval: 47.4,  $p < 0.001$ ). Girls temporarily compared favorably to boys (mean WAZ between age 12–17 months: -2.18 for girls vs. -2.45 for boys,  $p = 0.009$ ); thereafter, girls had poorer nutritional status (mean WAZ at 18–23 months: -2.64 for girls vs. -2.32 for boys,  $p = 0.014$ ; and -2.78 for girls vs. -2.35 for boys,  $p < 0.001$  at 30–35 months), as can be seen in Figure 5-3.

**Figure 5-2.**  
*Baseline Nutritional Status: Weight-for-Age by Age Group*

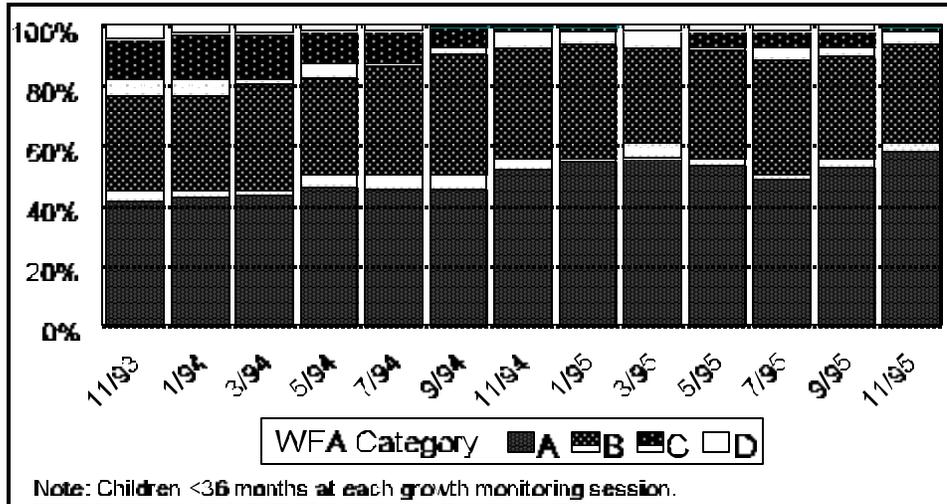


**Figure 5-3.**  
Baseline Nutritional Status: Mean WFA by Age Group by Sex

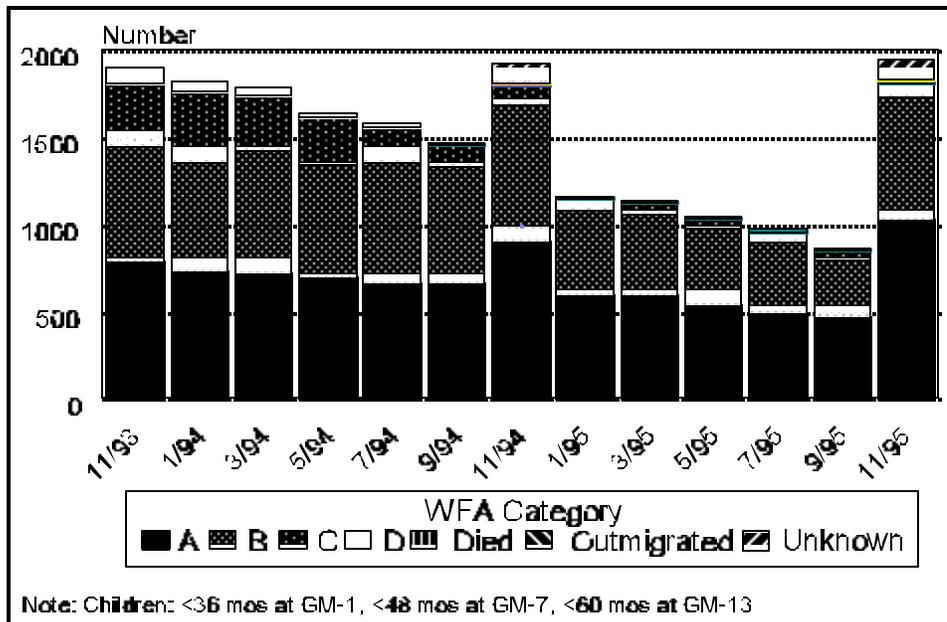


The nutritional status of the group as a whole on average improved 0.36 WAZ (from -2.14 to -1.78) regardless of sex (increase in mean WAZ: + 0.38 for girls vs. + 0.33 for boys,  $p = \text{NS}$ ) or baseline nutritional category. Younger children had slightly better nutritional improvement (change in WAZ regressed on age in months:  $R = -0.27$  [95% CI: -0.32, -0.23]). Figure 5-4 shows the prevalence of severe malnutrition ( $<-3Z$ ) among U3s decreased from GMP-1 to GMP-13 (23% [434/1893] at GMP-1 vs. 6% [105/1629] at GMP-13, relative prevalence 3.56, 95% CI: 2.90–4.36,  $p < 0.001$ ).

**Figure 5-4.**  
Growth Monitoring Sessions: Cross-Sectional Weights-for-Age



**Figure 5-5.**  
Growth Monitoring Sessions 1–13: Longitudinal Weights-for-Age



Children who were under age 3 at baseline were reweighed on each November anniversary (Figure 5-5). Children with severe malnutrition (categories C and D) markedly decreased during program year one (22.9% [434/1893] vs. 6.2% [112/1806],  $p < 0.001$ ) with less decrease during

program year two (6.2% [112/1806] vs. 4.1% [74/1817],  $p = 0.004$ ). Most of the baseline category C and D children reached category A or B (378/434 [89.2%]) after two years (Table 5-1). Very severe malnutrition virtually vanished (72/1893 [3.8%] vs. 3/1817 [0.2%],  $p < 0.001$ ). Follow-up for category C and D children was equivalent to that for their better-nourished counterparts (424/434 [97.7%] of categories C and D vs. 1409/1459 [96.6%] of categories A and B,  $p = \text{NS}$ ).

**Table 5-1. Growth Monitoring Sessions 1 & 13: Final vs. Baseline Status**

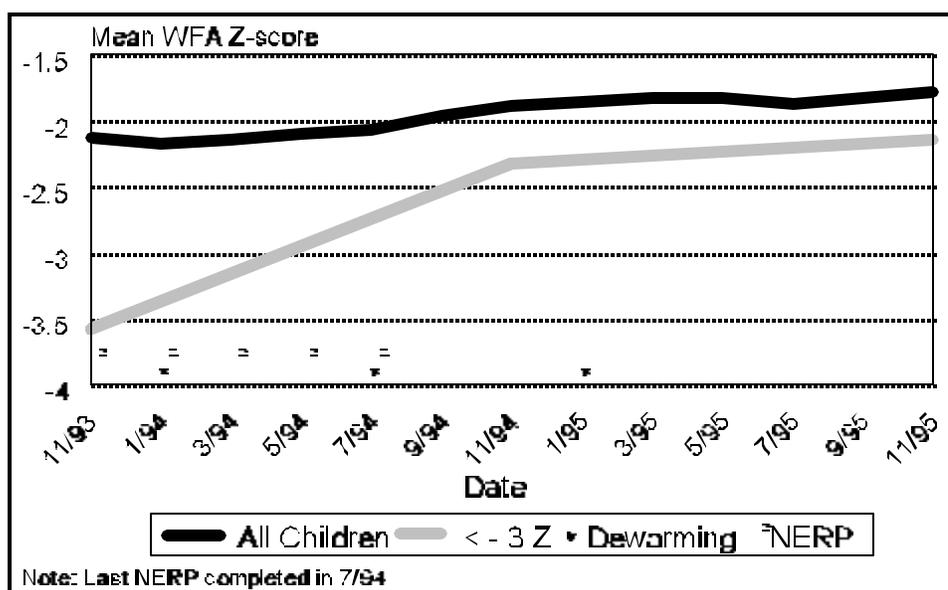
	Baseline	A	B	C	D	Died	Migrated	Unknown
A	791	564	187	10	2	4	3	21
B	668	321	284	28	1	8	6	20
C	362	125	201	23	0	3	0	10
D	72	17	44	10	0	1	0	0
<b>Total</b>	<b>1893</b>	<b>1027</b>	<b>716</b>	<b>71</b>	<b>3</b>	<b>16</b>	<b>9</b>	<b>51</b>

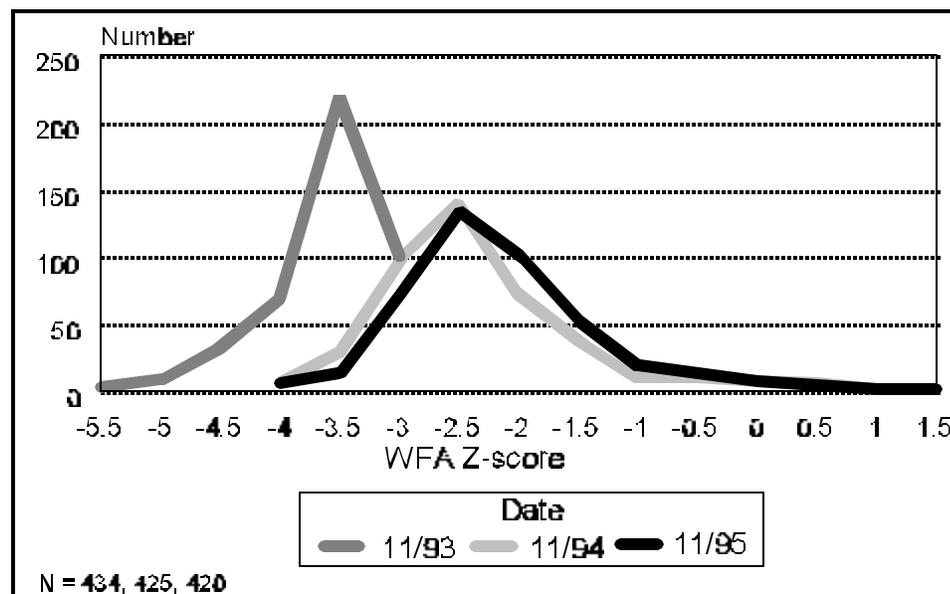
**Table 5-2. Growth Monitoring Sessions 1 & 13: Prorated Known Outcomes Allocated among Lost to Follow-Up**

	Baseline	Percentage					Death Rate (000)
		A	B	C	D	Died	
A	791	74	24	1	0	1	2.5
B	668	50	44	4	0	1	6
C	362	36	57	6	0	1	4.1
D	72	24	61	14	0	1	6.9
<b>Total</b>	<b>1893</b>	<b>56</b>	<b>39</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>4.2</b>

Applying the risks of known outcomes (A–D or died) by baseline status (A–D) to those who out-migrated or were otherwise lost to follow-up refines the estimated program effect (Table 5-2). The number of children who were normal or only moderately malnourished increased (prevalence in category A: 791/1893 [41.8%] at baseline to 1062/1893 [56.1%],  $p < 0.001$ ; prevalence in category B: 668/1893 [35.3%] at baseline to 740/1893 [39.1%],  $p = 0.02$ ). The overall annual mortality was 4.2/1000 (95% CI: 1.8–8.3) and was not associated with baseline nutritional status (chi-square for linear trend = NS).

Severely malnourished (<-3Z) children decreased by 85% in program year one from 434 to 68, with an additional 50% decrease during year two (from 68 to 33). Indeed, most of the improved nutritional status among all children under age 3 years was due to the improvement among this seriously malnourished group (mean WAZ improvement: -1.44 from -3.58 to -2.14), which comprised 23% (434/1893) of the baseline population (Figure 5-6). Categories C and D were thus rehabilitated to a nutritional status numerically equivalent to the whole group at baseline. There was no effect on the improvement in this group by age at baseline ( $R=0.01$ , 95%CI: -0.09, -0.11).



**Figure 5-6.***All Children: Two-Year Follow-Up***Figure 5-7.***Severe Malnutrition: Two-Year Follow-Up (Weight for Age <-3Z 11/93 Baseline)*

The marked improvement for category C and D children is graphically portrayed where the distribution of individual Z-scores progressively shifts to the right (Figure 5-7). Although the curves for 1994 and 1995 appear as similar, the areas under the curve segments corresponding to categories A and C are different. Baseline categories A and B together showed no change in overall nutritional status (-1.70 mean Z-score at baseline vs. -1.68 after year two,  $p = \text{NS}$ ); however, this was because of the canceling effects of opposing trends. Group B improved (difference in mean WAZ: +.58 from -2.51 to -1.93), while group A worsened (difference in mean WAZ: -0.44 from -1.03 to -1.47), both changes highly statistically significant ( $p < 0.001$ ).

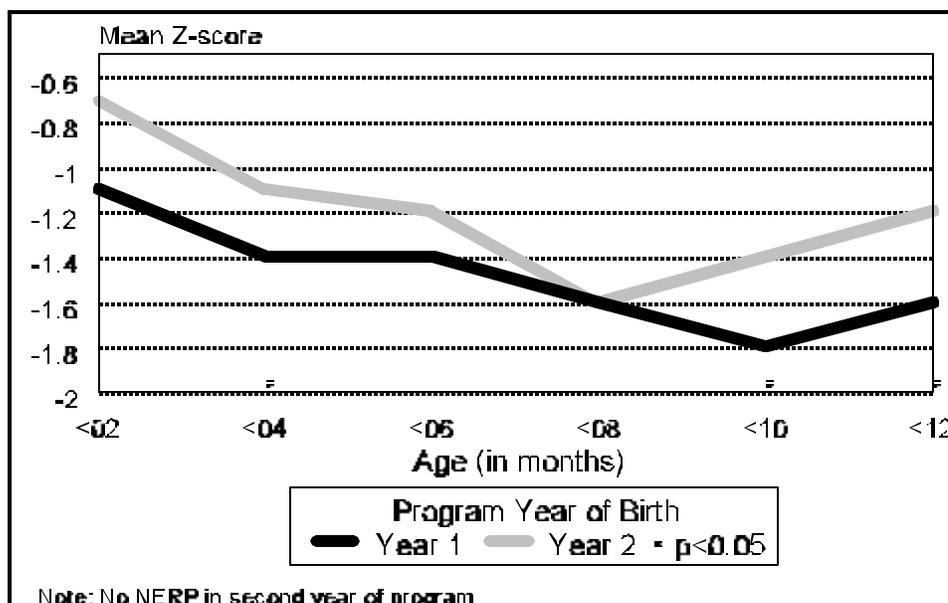
Those between 18 and 23 months of age at baseline ( $n = 244$ ) improved their nutritional status during the program (mean WAZ: -2.475 at baseline vs. -1.844 after year one,  $p < 0.001$ ) and maintained the improvement after graduating from the program (mean WAZ: -1.844 after year one vs. -1.745 after year two,  $p = \text{NS}$ ). Children born during program year two had the same or better nutritional status for age as their counterparts born during year one when the NERPs were active (Figure 5-8).

## Discussion

PANP used local solutions to alleviate childhood malnutrition significantly, rapidly and sustainably amidst settings of generalized poverty. The program improved all children's weight-for-age by 0.36 Z-score on average, and eradicated 82% (18.8/22.9) of all severe and very severe

malnutrition. The normal group increased 34% (41.8% to 56.1%), while category B, moderate malnutrition, increased 11% (35.3% vs. 39.1%).

**Figure 5-8.**  
Community Spread of Effect: WFA by Age of Infant at Program Year of Birth



Recently it has been reported that risks of child mortality due to infectious disease were remarkably dependent on severity of nutritional status and were similar across numerous developing country settings (Pelletier et al. 1995). The relative risk for death compared to children with normal nutritional status increased geometrically for worsening nutritional category: 2.5 for mild, 4.6 for moderate and 8.4 for severe (closely approximating our categories B, C, and D). If we apply these risks to our children (including one for category A), using an indirect standardization approach, PANP averted 30.3% (standardized RR compared to normally nourished population: 2.499 at baseline vs. 1.741 after year two) of childhood deaths due to infection (Table 5-3).

**Table 5-3. Standardizing Relative Risks of Mortality due to Malnutrition: GMP-1 and GMP-13**

Category	GMP-1			GMP-13		
	N	RR	Weighted RR	N	RR	Weighted RR
A	791	1	791	1062	1	1062
B	668	2.5	1670	740	2.5	1850
C	362	4.6	1665	72	4.6	331
D	72	8.4	605	3	8.4	25

**Table 5-3. Standardizing Relative Risks of Mortality due to Malnutrition:  
GMP-1 and GMP-13**

<b>Total</b>	1893	2.5	4371	1877	1.7	3268
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Note: RR @ GMP-13 / RR @ GMP-1 = 0.68, averting 32% of deaths from malnutrition.

A birth rate of 29/1000 (UNICEF 1995) in this population of approximately 25,000 yields 725 live births annually. At least half of the U5 mortality rate of 48/1000 (UNICEF 1995) could be due to infection, claiming 40 children over two years. Thus, PANP could avert up to 12 ( $40 \times 0.303$ ) of the projected child deaths over the period of the project, assuming most deaths occurred before age 3 years. The 16 deaths observed in these children are consistent with such a reduction.

Subgroup analysis showed that even high-risk children, age 18 to 24 months, were rehabilitated during the program; and they maintained their improvement after the NERPs were finished. Moreover, the improvement persisted even after they graduated from the program. Furthermore, the beneficial nutritional effect spread throughout the community: those born after the “curative” NERPs were discontinued had better nutrition than their counterparts born in program year one. Mothers had continued to use good nutritional practices when rearing their next child.

Alternative explanations for the improved nutritional status must be considered. A generalized improvement in living standard or nutritional status was unlikely to have occurred as suggested by similar GMP-1 profiles from other PANP cycles begun in other district communes before and after the experience reported here. Deworming, as part of the intervention, probably contributed to the effect, but its role was unlikely to be central since nutritional improvement in other cycles preceded its implementation. Moreover, only children under 3 years of age were treated rather than all children. Commune EPI and vitamin A supplementation more than likely improved concomitant with initiation of every-six-month campaigns in November 1993; however, improved national immunization coverage has not correlated with improved child nutrition.

Finally, one should at least consider fictitious data, perhaps manipulated to achieve targets. However, independent evaluations by the NIN confirmed improvements in child nutritional status in other PANP cycles (NIN Survey, October 1995, as quoted in Berggren and Tuan 1995). Moreover, targets were either not used or not communicated to the field staff. Finally, computer-assisted monitoring of HVs showed that they randomly, rather than systematically, misclassified nutritional status in the approximately 10% of assessments in which they erred; this also argues against data manipulation.

This interim report begs further analysis. Key steps in the future should include: (1) subgroup analysis of NERP participants; (2) subgroup analysis of NRLF participants; (3) cost analysis; and (4) collating experience for the four PANP cycles for which computerized data are available. Program management data (Sternin and Choo 1995), nonetheless, suggest that the quantitative findings reported here are consistent with the larger PANP experience.

## Conclusion

Our final thoughts, then, rest on the apparent conclusion that PANP works. How widely applicable is the PANP experience? Is Vietnam a positive-deviant nation from which other peoples can learn? Literacy since the American war is nearly universal. Communism's heritage of central planning through targets, although often misguided, has instilled a quantitative culture. National policy endorses population control and child nutritional improvement. Classless, casteless Vietnamese people may be easy to “mobilize” because of their discipline, obedience and

reverence for education (*i.e.*, training). The ubiquitous public address systems certainly facilitate information, education and communication (IEC). Finally, the positive-deviant food is, in many communes, free for the gathering. Other settings could capitalize on these or different strengths.

Wiser through discovering apparent solutions for an intractable problem, we would not be surprised to learn that other common, recognizable and important problems can be dramatically ameliorated with local, nontechnical solutions. While perhaps not a panacea, positive deviance is not a “niche-tool” either. Resting squarely on equity, positive deviance not only targets those in need, but also requires guidance from them. Positive deviance deserves wide usage.



# Chapter 6

## Initiation of the Shishu Kabar Program in Southwestern Bangladesh

Lisa Filoramo

### Summary

Health professionals have been trying to combat the problem of malnutrition for many years. According to UNICEF's 1995 statistics, it is estimated that 190 million children worldwide die from malnutrition each year. Food distribution programs are ineffective for the long term. Other nutritional programs such as hospital rehabilitation units or Mothercraft Centers, which have had a positive impact on small numbers of children, are costly and therefore difficult to sustain. Besides, their impact does not extend to entire communities, which is what is needed to reverse the pernicious effects of childhood malnutrition.

A modified Hearth nutritional program was implemented in Bangladesh in 1995 by World Relief Corporation (WRC) and Christian Service Society (CSS) in the context of their overall Child Survival Program (CSP). It was renamed *Shishu Kabar*, which means child's food in Bengali. A team of five trainers, under the supervision of the CSP director and a health educator, trained from three to seven volunteer mothers in each selected community to run the two-week feeding sessions for malnourished children under 2 years of age (U2s), who had been dewormed, weighed and measured for length at the growth monitoring sessions. A designated home kitchen in the community was used for SK sessions.

A positive-deviant approach was used to identify the foods and amounts used in the preparation of meals, frequency of meals and snacks and breastfeeding practices of community mothers whose children were well nourished. One pilot test and three SK rotations were completed between July and October 1995, serving 482 children. However, initial results from the follow-up weighings include only the first follow-up weighing for the pilot test and from rotations one and two. The data show that 85% of the participants had catch-up or adequate growth one month after the sessions were over. The figure went up to 90% at the two-month follow-up weighing.

Modified applications of the Hearth program implemented in Haiti and Vietnam have shown equally promising results. It seems that the program can be successfully adapted to diverse settings and may be an inexpensive but appropriate and sustainable solution to childhood malnutrition. Additional research is needed to assess actual impact over the long term and the possibility of replicating the program in other countries.

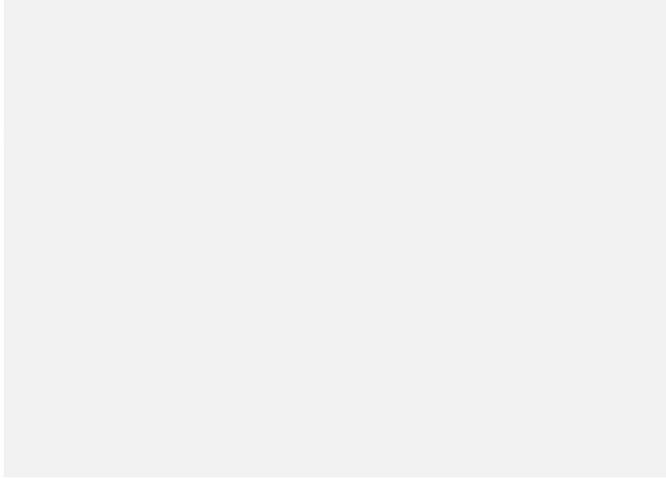
## Background

### Country Situation

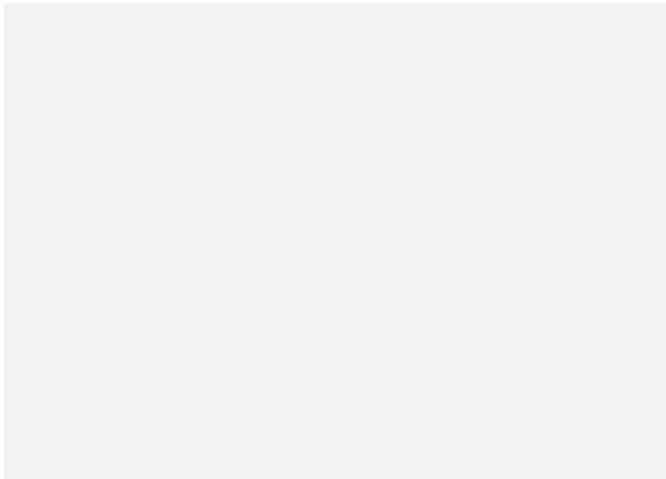
Bangladesh is located in a low-lying delta region and is surrounded by India to the north and west, Myanmar to the east and the Bay of Bengal to the south. The topography includes several rivers that drain the Himalayas to the north into the Bay of Bengal. During the monsoon season, from June through September, annual floods jeopardize harvests, ravage homes and make travel difficult. It is one of the poorest countries in the world, with alarmingly abysmal social indicators and

## Shishu Kabar in Pictures

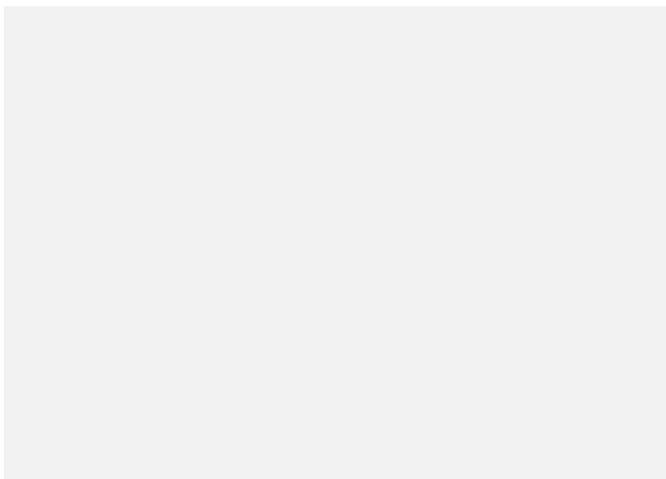
1. Hearth program leaders identify malnourished children in their communities.



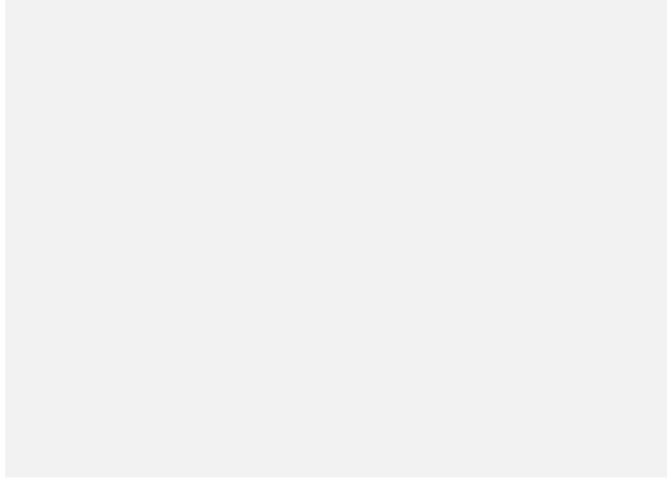
2. Nutrition promoters learn skills, survey villages to find mothers with healthy youngsters.



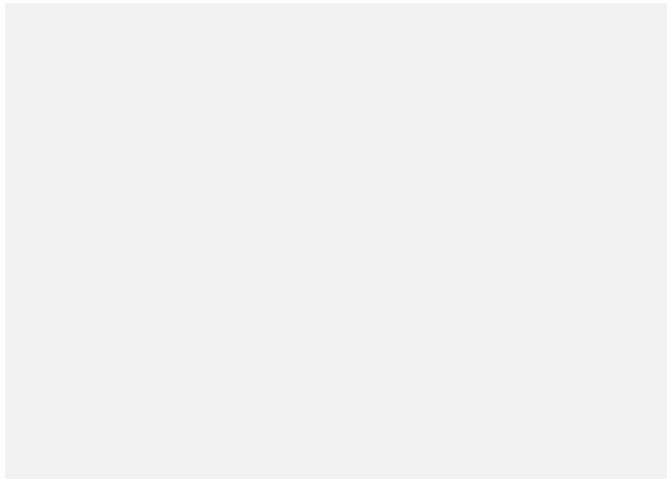
3. Mothers with healthy youngsters volunteer to cook for and help rehabilitate malnourished children.



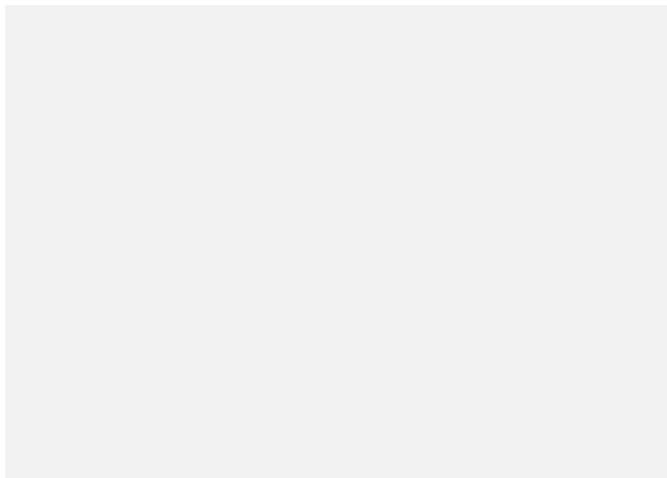
4. Hungry little ones eat calorie-dense food in volunteer mother's home.



5. Mothers and volunteers monitor growth of children.



6. Children begin to thrive!



Photos courtesy of World Relief: Photo credits 1, 4 & 6 Jim Whitmer; 2, 3 & 5 Carrie Mooneyham

the highest population density of any agricultural country, with 117.8 million people. The country has a Muslim majority of 87%; 11% of the population is Hindu and 2% others. Average family size is 5.12. Literacy is low at 47% for males and 23% for females. Poverty is ubiquitous with per capita GNP at \$220 per year. The mortality rate for U5s is high at 117/1000, and infant mortality is 91/1000 (UNICEF 1996a).

Eighty-six percent of the population of Bangladesh falls below the absolute poverty level for whom a minimal nutritionally adequate diet plus essential nonfood requirements are not affordable. The country has the highest rate of childhood malnutrition in the world with 67% of the children under 5 years of age (U5s) having some degree of malnutrition and 25% being severely malnourished according to weight-for-age measurements. Seventeen percent of these U5s are wasted and 63% stunted. It has been suggested that low birthweight, which has been estimated at 50% (again the highest in the world), along with other factors such as high population density, poor hygiene, low rates of exclusive breastfeeding in the first four months of life and the inequality and lack of freedom for women are the major contributors (UNICEF 1996b).

Statistics on gender differences in childhood malnutrition rates further exacerbate the situation:

- A typical Bangladeshi girl receives 20% fewer calories than her brother (UNICEF 1996b).
- Among severely malnourished children, the mortality rate of females is 45% higher than that of males (World Bank 1991).
- Out of the 14.7% of those children who were severely malnourished according to the Gomez classification of weight-for-age, 8.4% were girls versus 6.3% boys. Among the 6- to 71-month-old children who were stunted, 51.3% were girls versus 50.8% boys; and the prevalence of wasting in the same age group was 9.2% for girls and 8.1% for boys. In the 6- to 35-month age group, the difference between girls and boys was even more pronounced, with a prevalence of wasting at 13.8% among girls and 11.4% among boys (Bangladesh Bureau of Statistics 1990).

WRC has been working in southwest Bangladesh with the Christian Service Society (CSS) to implement a Child Survival Program (CSP) since June 1, 1987, in four unions of Batiaghata Thana and one union in Tala Thana. A first program expansion ran from October 1, 1991, to September 30, 1994, and covered the original five unions in Batiaghata and Tala Thanas, along with two new unions in Batiaghata, two new unions in Tala and one city slum area in Khulna. A second program expansion began October 1, 1994, in five unions of Paikgacha and Koyra Thana (Godaipur, Haridhali, Kopilmuni, Raruly and Amadi), not included in the previous project, and covering a population of 130,143. It is scheduled to end on September 30, 1997. The current project includes the interventions of immunization, diarrhea control, nutrition, acute lower respiratory infection control, maternal health and family planning and income generation.

### Evolution of the Hearth Nutrition Model

The genesis of the Hearth program can be traced to the Mothercraft Centers implemented in Haiti and other countries in the 1960s and '70s to rehabilitate malnourished preschool children.

That original model has been progressively modified to address limitations and concerns relating to the need for a larger impact, cost effectiveness, community participation and sustainability. In 1984, Berggren and colleagues developed a modified approach and called it the Nutrition Demonstration Foyer (NDF). The feeding sessions were shortened to two weeks compared to the three to four months in the Mothercraft Centers and took place in a local kitchen in the community. Save the Children Foundation (SCF) has implemented and evaluated a modified version of the NDF in Vietnam and has reported particularly dramatic improvements (Sternin, Sternin and Marsh 1997).

Nine years after the NDF program was initiated, a new version of it was implemented in Haiti and this time called the “Hearth,” the English word for the French word *foyer* (Berggren et al. undated). The Hearth program is based on the belief that mothers can rehabilitate their malnourished children by learning better ways of feeding them locally available, low-cost foods from the experience of “positive-deviant” mothers in their own community whose children are better nourished. This is done through two weeks of cooking and feeding sessions conducted by selected volunteer mothers in the community who have received a short five-day training to impart knowledge of nutrition and foster desired behavioral changes. Mothers learn by discovery and doing in the demonstration foyers. The visible improvement in the children’s appetite, activity level and weight gain are believed to be a strong inducement for the mothers to continue the new feeding practices long after the program has finished. Burkhalter and Northrup (1997) report that the program made a significant contribution to solving malnutrition in Haiti, especially in rehabilitating mildly malnourished children aged 1 to 4 years.

## Implementation of Hearth in Bangladesh

In 1995, a modified version of the Hearth model was implemented as a subprogram of the overall CSP being operated by WRC and the CSS that includes interventions in immunization, diarrheal disease control (DDC), acute respiratory infection control (ARI), nutrition, maternal care and family planning and income generation. The program was renamed *Shishu Kabar* (SK), which means child’s food in Bengali, and will be referred to as such throughout the remainder of this paper.

The nutrition intervention under CSP includes bimonthly growth monitoring and counseling for U2 children, vitamin A supplementation for children aged 6 to 71 months, deworming of children from

## Hearth Model

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aged 24 to 71 months and the SK program for the rehabilitation of malnourished children<sup>5</sup> aged 6 to 23 months identified through growth monitoring.

Before the initiation of the SK program in July 1995, malnutrition rates for U2 children (identified through the project's ongoing growth monitoring activities) are shown in Table 6-1. The rates are shown for two seasons: January, when food is less costly and more available; and June, when food is costly and less available.

**Table 6-1. Seasonal Malnutrition Rates**

	January 1995	June 1995
Mildly–moderately malnourished	30.2%	30.5%
Severely malnourished	5.2%	6.9%
<b>All degrees of malnutrition</b>	<b>35.4%</b>	<b>37.4%</b>

A baseline survey and focus groups conducted in March 1995 revealed several factors influencing child nutrition in the project area, such as:

- Ninety-six percent of the mothers of U2 children breastfeed, 64% exclusively breastfeed for four months and 45% initiated breastfeeding in the first 14 hours after birth.
- Seventy-nine percent of the mothers feed their children supplementary foods starting from age 5 to 8 months. However, it is a common practice in some households to begin supplemental feeding of boys at 5 months old, while waiting until 7 months for girls. In many families, fathers eat first, children next and mothers eat last.

The SK program timeline is presented below.

April 1995	SK trainers hired
May–June, 1995	Training of SK trainers in growth monitoring and practice conducting growth monitoring sessions
July 2–10, 1995	SK trainers trained in Hearth
July 15–27, 1995	Pilot test

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<sup>5</sup> Estimates of malnutrition for the SK program are based on weight-for-age measures using the growth chart developed by the Bangladesh National Nutrition Council. This chart is a variation of the Road-to-Health card and is based on NCMS's reference standards. Children falling above or between the first and second lines on the chart are classified as nutritionally normal; those falling between the second and third lines are classified as mildly to moderately malnourished; and those falling below the third line are classified as severely malnourished. The lines correspond to the following:

First Line	50 <sup>th</sup> percentile for boys (median)
Second Line	upper 3 <sup>rd</sup> percentile for girls
Third Line	60% of median (or first line)

July 29–August 3, 1995	SK trainers prepare curriculum and materials for training volunteer mothers
August 5–31, 1995	First rotation of SK
September 2–21, 1995	Second rotation of SK
September 30–October 19, 1995	Third rotation of SK

## Program Details

### Personnel

The staff of the SK program includes the CSP director, who is responsible for overseeing and supervising the program, a health educator and five SK trainers to train and supervise volunteer mothers. An expatriate nutrition adviser from WRC assisted and trained SK personnel in the implementation of the program until October 30, 1995, after which time the program was fully nationalized. One of the SK trainers was promoted to the position of coordinator to plan, supervise and train the trainers. The job description and qualifications for the SK coordinator and SK trainers are presented in Table 6-2.

**Table 6-2. Qualifications and Job Descriptions of SK Coordinator and Trainers**

Personnel	Job Description	Qualifications
SK Coordinator	Hold community meetings to discuss program, enroll children and recruit volunteer mothers and one man to shop for food	Female Bachelor's degree or in progress Ability to read English
	Train and supervise volunteer mothers	Ability to conduct training
	Conduct follow-up weighings	Ability to solve problems
	Keep attendance records of participants	Good interpersonal skills
	Conduct monthly market surveys in program communities	Supervisory skills
SK Trainer	Train new SK trainers	Female
	Supervise activities of trainers	Higher secondary degree (12 years)
	Weekly meetings with trainers for reporting, problem-solving, refresher training	Living in or willing to live in project area Ability to teach and speak in front of groups
	Take length measurements of SK children	Experience in community service preferred
	Ensure accuracy of trainers' reports	
	Write monthly progress report for CSP project director	

### Training of Trainers

In June 1995, the health educator at CSP was trained by the nutrition adviser for one month in participatory educational techniques and use of the curriculum for the trainers. He conducted the training of the trainers from July 2 to 10, 1995, with the assistance of the CSP director and nutrition adviser. The trainers were trained for three days (24 hours) at the growth monitoring center (GMC). They then assisted the center's staff at regular weighing sessions for two months before the initiation of the SK program to practice weighing children. This was followed by another seven days (56 hours) of participatory training in basic nutrition. After a final revision of the training curriculum, the schedule was shortened to six days.

Day one covered basic nutrition principles and observation of malnourished children; day two was devoted to SK goals and objectives and the 24-hour diet recall of positive-deviant mothers. Tabulation of the diet recall, preparation of menus and marketplace activity were done on day three. Day four was used to revise menus, recalculate calories and protein, prepare meals and master program protocol. Day five included follow-up and referral, organization of the community meeting and supervision. A written test, evaluation of training and steps for organizing the SK session made up the sixth day. The training methodology was based on self-discovery through observation, learning-by-doing, discussion, role play and games. By the end of the training, the SK trainers were able to:

- Motivate the mothers of the malnourished children in the community to participate in the SK session for two hours each day for 12 days.
- Motivate the community to select a volunteer mother to receive five days of training and be responsible for three to seven families in her community during the two-week SK session.
- Identify mothers of well-nourished children.
- Carry out pictorial 24-hour diet recall with illiterate mothers (Annex 6-A).
- Tabulate the results of the 24-hour diet recall (including foods, spices, fuel, local tastes for the season) and approximate amounts using local measurements.
- Buy foods for the menu at the local market at a known fixed price and bargain for a good price.
- Calculate the nutritive value in calories and protein of the meals and snack foods.
- Weigh and identify children who are mildly to moderately malnourished or severely malnourished.
- Organize three to seven mothers to meet and participate in each SK session.
- Train volunteer mothers to conduct the SK sessions in their homes.

In addition, trainers needed to be able to:

- Interpret the growth card.

- Know the composition, cost and frequency of feeding for a normal U2 child. The meal given in each feeding session had to contain from 700 to 1000 calories and 20 to 30 grams of protein.
- Be able to explain their conviction that volunteer mothers can rehabilitate their malnourished children using practices already established within the community.

Once this training was complete, a pilot test was conducted in which each trainer held her own SK session. The nutrition adviser observed one session for each of the SK trainers and counseled them about improvements. Revisions were also made to the program based on lessons learned during the pilot sessions. The trainers then spent an additional three days (24 hours) learning how to train the volunteer mothers. Preparation of materials, documentation of activities and indicators in the HIS also were covered.

Throughout the implementation of SK in the communities, weekly meetings were held on the first day of each week and some of this time was taken for refresher training and problem-solving. In addition, at least once each month at one of these meetings, new training was given in an area of interest, such as how to deal with breastfeeding problems or how to feed a child with diarrhea.

### **Training of Volunteer Mothers**

The SK trainers trained a new group of volunteer mothers each month in new communities. The volunteer mothers were trained two hours each day for five days. During day one, volunteer mothers learned basic nutrition principles. Day two covered SK goals and strategy, and mothers conducted the 24-hour diet recall of the positive-deviant mothers. On day three, they learned to tabulate the results from the 24-hour diet recall; day four was devoted to learning to calculate cost per child, and menu and meal preparation. SK timeline and steps for conducting the SK session were taught on the final day. The training method was based on a participatory approach, using discussion, practical experience and role play. By the end of the training, the volunteer mothers were able to:

- Carry out 24-hour recall of diet with illiterate mothers.
- Understand the four food groups, that is, main food, energy foods, body builders and protective foods, and the foodstuffs in each.
- Understand the four main causes of malnutrition.
- Buy foods for the menu at the local market at a known fixed price and bargain for a good price.
- Organize three to seven mothers to meet and participate in the daily session for 12 days.
- Prepare the foods according to the menu and in amounts as taught by the SK trainer.
- Teach community mothers in the SK session to cook the high-calorie, high-protein meals using correct amounts of ingredients, as well as the benefits of these foods for their children.

### Developing Menus for the SK Sessions

Menus for the SK sessions were based on information received from the 24-hour diet recall of positive-deviant mothers and consisted of low-cost, locally available nutritious foods. This also allowed the volunteer mothers (usually mothers of malnourished children) to learn directly from mothers of well-nourished children whom they often saw as role models.

Interviews to discover foods used by the positive-deviant mothers were conducted by the trainers, and the results of the 24-hour diet recall were tabulated on the following day. This data provided information about the frequency of breastfeeding, meals and snacks, and the kinds and amounts of food being used by positive-deviant mothers to feed their children. Based on this information, the trainers developed three menus to be rotated four times over the 12 days of the sessions. Since the goal of the program is to begin the rehabilitation of malnourished children, total calories and protein had to be more than required for daily needs—at least 700 calories and from 20 to 30 grams of protein. The menu included a snack in addition to the main meal, to be given while the main meal was being prepared.

The average income for a family of five in Bangladesh is about 25 *taka* (\$0.62 US) per day; therefore, it was necessary to keep the cost of the daily meal to 5 *taka* or less per child for foods that would have to be purchased in the market. Some foods, which are expensive in the market, are available in most homes free of cost, such as fish, eggs and some vegetables and fruit. However, the program purchased these foods for the feeding sessions as well as for daily snacks plus fuel for cooking. Therefore, the cost per SK meal per child was set at 8 *taka*.

The SK sessions described in this paper were implemented during the monsoon season. The most commonly mentioned foods in the 24-hour diet recall of mothers of well-nourished children were combined into three common types of meals: (1) a kitchuri meal including eggs, (2) a kitchuri meal without eggs and (3) a fish, potato and leafy green vegetable meal. Kitchuri is made of rice, lentils (*dahl*), one or more vegetables and oil. This meal is based on positive-deviant practice at the time of the sessions. Generally, eggs and fish were expensive in the market, so the kitchuri meal without eggs could be used by those who did not have these ingredients in their homes. Since many do have eggs and fish available in their homes, we decided to retain these important sources of protein in our menus. Of course, seasons and market prices affect availability of foods, but the foods used to develop menus ensured to a large extent that these foods were available, low in cost and appropriate.

Although the menus were based primarily on ways the mothers of the well-nourished children had cooked, it was still difficult to get the number of calories in the meal up to 700. This was because most high-calorie items such as oil or coconut, which are sometimes available in the home, are very expensive in the market. Even though we tried to increase the calories by adding sugar rather than increasing the amount of oil, we did not succeed in meeting the target for calories. It was then observed that peanuts, which are high in calories as well as in protein, are available in every market, are inexpensive and acceptable to village people. However, they are not often fed to young children because the Bangladeshis are used to eating them whole.

The trainers experimented with mashing the peanuts and mixing them in the kitchuri, thus increasing the calories and protein as well as imparting a nice flavor to the food. This has been accepted by the mothers as long as they were shown how many peanuts to use and how to crush them. The children seemed to like the taste of this new kind of kitchuri, so it worked out well as a solution to the problem. Sample menus based on the 24-hour diet recalls are shown in Annex 6-B.

### **Selection of Communities and Enrollment of Children**

The coordination of the SK sessions began with the selection of communities. The selection criteria included: (a) the season, (b) the location and (c) the number of malnourished children in the community. During the monsoon season, the communities that were closest to the program's area offices and had the greatest number of malnourished children were chosen first. Travel is extremely difficult during the monsoons; therefore, the accessibility of these communities was an important consideration for female trainers who would have to travel there by rickshaw or on foot. However, during the dry season, the areas farthest from the offices would be chosen to cover the whole project area once by the end of the 18 months. After the entire project area has been covered once, communities will be targeted for a second round of SK.

The goal of each of the SK trainers was to train eight volunteer mothers who in turn would each train a group of three to seven mothers. Thus, 50 children would be enrolled from one or more communities per rotation per union, in other words, per trainer, which comes to a total of 250 children per rotation. This target was reduced, however, to a total of 40 children per rotation per trainer, or a total of 200 children per rotation due to the distances between housing clusters, the schedules of mothers and the cultural constraints on their mobility. It was sometimes necessary to conduct two separate training sessions.

### **Community Meeting**

Once the malnourished children have been identified in a community selected for a rotation of SK, the trainer conducts a community meeting with the community or communities selected for the next rotation of SK. In the community meeting, the SK trainer gives feedback from the previous growth monitoring session and explains how the SK program works to rehabilitate malnourished children. The community is asked to participate by selecting volunteer mothers to receive one week of training and hold the SK session for two weeks. The community is also asked to designate a male volunteer<sup>6</sup> to purchase the foods and a home in which the sessions can be conducted for two hours each day for the duration of the sessions.

The prerequisites for participation are clearly explained and the mothers are asked to agree to the following conditions before their malnourished children can be enrolled in the program: (a) to continue feeding their children at home the normal meals during their enrollment in the sessions,

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<sup>6</sup> Unlike many other countries, women in Bangladesh generally do not shop for food in the market. Shopping for food is mostly done by the males in the family. Therefore, we decided to recruit men to do the shopping for the SK sessions.

(b) to continue feeding their children as shown in SK for two weeks after the session ends, (c) to agree to allow their children to be weighed and measured for height on the first day of the session as well as at the one- and two-month follow-up weighings. The trainer then assigns these mothers to the volunteer mother who is to conduct the sessions, and a schedule is set.

### Steps for Conducting the SK Community Meeting

- A visit is made to the community to set the date of the committee meeting with the community leaders, mothers and fathers.
- At the meeting, villagers are greeted and given information about the number of malnourished children in the community based on the last growth monitoring session.
- It is explained to them that the program wishes to conduct a two-week SK session in the community to rehabilitate the malnourished children, and their participation is requested. The trainer then explains the elements of the program to the meeting:
  - Each session runs for two weeks.
  - The mothers gather each day to prepare the SK meal and feed the children to help them grow.
  - The family must agree to give the child other meals as usual during the two weeks of the SK sessions as a condition of participation in the program.
  - The family must agree to feed the child the meals they learned about in the SK session for two weeks after the SK sessions are over as a condition of participation in the program.
  - Each child's SK meal costs between 4 and 5 taka, excluding cost of fuel and some ingredients.
  - The child will be weighed and measured for height on the first day of the session and will be weighed again one and two months later to see if the child's nutritional status has improved. The mothers must agree to bring their children to the weighing sessions as a condition of participation in the program.
  - The community must select a volunteer mother who is willing to receive five days of training (2 hours/day) and then to have 3–7 malnourished children and their mothers come to her home for 2 hours each day to cook the meals and feed the children for 12 days.
  - CSS provides the money for the purchase of food for the meals at 8 taka/meal (includes fuel cost).
  - A volunteer man who is trustworthy has to be selected by the community to purchase food for SK sessions. The community will know how much money he receives each week and will hold him accountable for purchasing the proper foods in sufficient quantities for the feeding sessions.

- The community is notified of the training dates and dates of the SK sessions.
- The community selects a volunteer mother and a volunteer man.
- The volunteer mother is informed of the date, time and location of the training.

### **Shishu Kabar Session**

When the training of the volunteer mothers is completed, the SK sessions run for two weeks beginning on the Saturday of the following week, and run each week until Thursday. Friday, a Muslim holy day and government holiday, is free. The volunteer man is given money to purchase food for the second week on Thursday of the first week. Sometimes mothers who miss the community meeting for some reason come to the first day of the session. If upon weighing, their children are found to be malnourished, they can be enrolled, provided the mothers agree to conditions noted above.

### **Steps for Conducting the Shishu Kabar Session**

- Mats are set out for children and mothers to sit on.
- When the mothers and children arrive, any dishes and spoons as well as any garden foods they may bring with them are collected and added to the meal.
- Mothers are asked to wash their hands and the hands and faces of their children with clean tubewell water and soap.
- The children are given a small snack while the mothers help cook the meal.
- During the cooking the ingredients, amounts and reasons why each type of food is necessary are explained to the mothers. The mothers of the malnourished children are asked to help prepare the meal.
- The mothers and children are asked to wash their hands again before the main meal.
- Children are seated on the mats and the meal is served to them.
- Mothers are encouraged to assist their children with the meal. If a mother is not doing so, the trainer shows her how to best help her child to eat.
- At the end of the meal, the attendance sheet for the session is filled out.

### **Supervision**

The trainers, who supervise the volunteer mothers, visit each session twice a week, on the first and last day of the week. During these visits, the trainer observes the session, fills out a supervisory checklist on the session (see sample checklist in Annex 6-C) and discusses changes and improvements with the volunteer mother if necessary. The trainer also ensures that proper ingredients and amounts are being used in the meals and that the mothers know these ingredients and amounts. The trainer also makes sure that the mothers know the four food groups and types of foods in each, frequency of daily meals and snacks and the benefits of the diet for their

children. The trainer then fills out the checklist and writes her comments at the bottom of it. The checklists are turned in to the SK coordinator at the training and problem-solving meeting on the following Monday.

The trainers are supervised by the SK coordinator, who observes both the training sessions of the volunteer mothers and the SK sessions. During the week-long training of the volunteer mothers, the coordinator visits one day's session for each of the trainers and compares the actual training being given with the activities listed in the training curriculum. She assigns scores to the trainers based on whether or not all important points were covered and whether participatory methods were used and used properly. The coordinator discusses the training session with the trainer, pointing out strengths and weaknesses, and makes suggestions for improvements.

The coordinator also visits each of the SK sessions twice per rotation. In the first week, the visits are made in the first two days to measure heights of the participating children and to briefly observe the session. During the second week of the sessions, she visits each trainer's session again, but this time to observe at least one or two of each trainer's sessions all the way through. She fills out the supervisory checklist, making sure all the steps are followed, and finds out from the mothers of the malnourished children if they know what foods are being cooked in what amounts and why these foods are good for their children. She also asks about the recommended frequency of breastfeeding and the number of meals given. She writes her comments, if any, on the bottom of the supervisory checklist and gives each volunteer mother and trainer a score. She then commends the trainer's good points and makes suggestions for improvement if needed.

The CSP director visits the sessions in each union at least once per quarter to ensure that the program is running smoothly and being properly supervised by the coordinator. The director discusses strengths and weaknesses of the program with her and suggests improvements as needed.

### **Follow-Up**

Follow-up weighings are conducted at one month and again at two months after the first day of each session. The children are considered to have shown catch-up growth at the first follow-up weighing if they have gained 400 grams or more, adequate growth if the gain is from 200 to 300 grams and growth failure if the gain is less than 200 grams. At the second follow-up weighing, a gain of 700 grams or more is considered catch-up growth, a gain from 200 to 600 grams is considered adequate growth and gain of less than 200 grams is considered growth failure.

If a child shows catch-up or adequate growth, the trainer explains this to the mother using the growth chart and encourages her to continue to feed her child as she has learned to do in the SK program. However, if the child shows growth failure at either of the follow-up weighings, the trainer tries to determine the cause—the mother either did not practice the new behavior or does not have enough money to feed the child, or the child has an underlying illness. In the first case, she encourages the mother to begin practicing what she has learned and lets her observe the improvement in children whose mothers have done so. If the problem is financial, the trainer recommends the mother for enrollment in the income-generation program of the CSP. If the growth failure is likely to be due to underlying illness, the trainer refers the mother to the district

health complex and gives her a referral slip. The trainer, in this case, is required to inform both the community health worker and the supervisor at CSP of the referral. This is done to facilitate a follow-up home visit to make sure that the child was taken to the health center and did receive adequate treatment. See the follow-up schematic used by the trainers in Annex 6-D.

### **Health Information System**

The health information system (HIS) for SK is part of the census-based system for the overall child survival program. Data collected for the SK include separate lists of better-nourished children and malnourished children from each growth monitoring session, thus covering all children who attend the GMC sessions. These lists include the child's name and sex, house number, name of father, date of birth, date of weighing, weight (in kilograms), nutritional status, weight gain and height (in centimeters). The lists are made at the growth monitoring session by the supervisor and given to the respective trainer. The list of malnourished children is used to enroll them in the SK program at community meetings. The list of better-nourished children is used to identify their mothers so that the volunteer mothers can interview them and do the 24-hour diet recall to learn their positive-deviant behaviors.

The information from the list about children who would be eligible for the next rotation of the SK is transferred to her register (Annex 6-E) by the trainer. This information is collected at the GMC session on the first day of the SK session before the feeding when weights and heights are recorded, and at the first and second follow-up weighings. Volunteer mothers also keep an attendance sheet of mothers enrolled in their SK sessions. Only mothers who have had two or fewer absences are considered to have completed the session.

The SK coordinator collects information from the trainers at weekly Monday meetings to update a similar list she keeps so that she can verify the data and check for accuracy. From this information she makes a monthly progress report to the CSP director. The CSP director is expected to use this information for quarterly reports to WRC headquarters in Wheaton, Illinois. The information also is fed back to the community during the follow-up weighings.

### **Incentives**

The SK trainers were initially able to recruit volunteer mothers with no incentive other than prestige and the fact that they could feed their own children in the SK sessions. Eventually, many of the volunteer mothers complained about not being paid for their work. Recognizing that the success of the program in new communities depended to a great extent on its reputation, with implications for the larger child survival program as well, the program management decided to present the volunteer mothers with a nice set of dishes at the end of the sessions, thus avoiding cash payments. This helped the volunteers feel appreciated and made it easier for trainers to recruit mothers in new communities.

Incentives for the SK trainers include the freedom to be creative and to be able to suggest improvements in the program. Their constructive ideas are incorporated into the program to encourage a sense of ownership and involvement in decision-making. The weekly meeting on

Monday provides a forum for applauding such contributions. Trainers also are encouraged to share successes and problems among themselves. This fosters a team approach to problem-solving and creates a supportive atmosphere for reciprocal learning.

Another incentive intended to motivate the trainers to strive for optimal results is a cash award of 500 taka to the best trainer each quarter. The winner is chosen on the basis of scores earned on the coordinator’s supervisory checklist plus the percentage of children showing catch-up growth upon completion of the sessions.

## Initial Results

By October 31, 1995, a pilot test and three rotations of SK sessions had been completed. A total of 482 children were enrolled in the sessions and 433 (90%) of them completed the session with two or fewer absences. Although there were more girls (279=58%) than boys (203=42%) among the 482 participants at the time of enrollment, a greater percentage of dropout was seen among the girls (12%) than the boys (10%); this seems to agree with studies on gender bias cited earlier in this paper. Results from the follow-up weighings only include the first follow-up for the pilot test and rotations 1 and 2, and the second follow-up for the pilot test and first rotation. A total of 86% who had completed the sessions were present at the one-month follow-up weighing and 92% were present at the two-month follow-up weighing.

The compiled results for the first follow-up weighing from the first and second rotations are shown in Table 6-3. Sometimes children identified as malnourished a month earlier at the GMC session had recovered normal status by the first day of the SK sessions. As a result, several of them who completed the sessions were well-nourished at the baseline and are not included in Table 6-3. Also, several of the children who completed the sessions did not show up for the follow-up weighing and thus are excluded from the analysis.

A total of 161 (85%) of all children who completed the SK session showed either catch-up or adequate growth. The severely malnourished children had the highest rate of growth failure at 24% as compared to only 13% for the mildly to moderately malnourished children. This result may be due to three factors—an underlying illness, the mother not practicing what she learned in SK or diffi-

**Table 6-3. Progress in Nutritional Status of Children Completing Shishu Kabar Program at One-Month Follow-Up Weighing**

Baseline Nutritional Status	One-Month Follow-Up Results			Total
	Catch-up Growth N (%)	Adequate Growth N (%)	Growth Failure N (%)	
Mildly–Moderately Malnourished	62 (41)	71 (46)	20 (13)	153
Severely Malnourished	14 (38)	14 (38)	9 (24)	37
<b>Total</b>	76 (40)	85 (45)	29 (15)	190

**Table 6-4. Progress in Nutritional Status of Children Completing Shishu Kabar Program at Two-Month Follow-Up Weighing.**

Baseline Nutritional Status	Two-Month Follow-Up Results			Total
	Catch-Up Growth N (%)	Adequate Growth N (%)	Growth Failure N (%)	
Mildly–Moderately Malnourished	51 (45)	50 (44)	12 (11)	113
Severely Malnourished	11 (35)	17 (55)	3 (10)	31
<b>Total</b>	62 (43)	67 (47)	15 (10)	144

culty in restoring the child's appetite. Further study will be needed to ascertain what percentage of growth failure can be attributed to each of these factors.

At the first follow-up weighing, we also noted that a total of 24 participants (13%) had moved up one level on the growth chart, either from mildly–moderately malnourished to normal (11=6%) or from severely malnourished to mildly–moderately malnourished (13=7%). Only one child had moved down a category from mildly–moderately malnourished to severe.

Table 6-4 presents results from the second follow-up weighing and includes data from the pilot test and first SK rotation only. Please note that a few of the mothers of children who had completed the SK sessions did not attend the second follow-up weighing.

As seen here, 129 (90%) of those who completed the two-week session and had the second follow-up weighing showed catch-up or adequate growth. This represents an increase from the first follow-up weighing and may indicate that the mothers whose children had growth failure in the first follow-up saw the improvement in other children and began practicing SK lessons at home. Another possibility is that the children were cured of their underlying illness and began to grow. The actual reason should be assessed through further study.

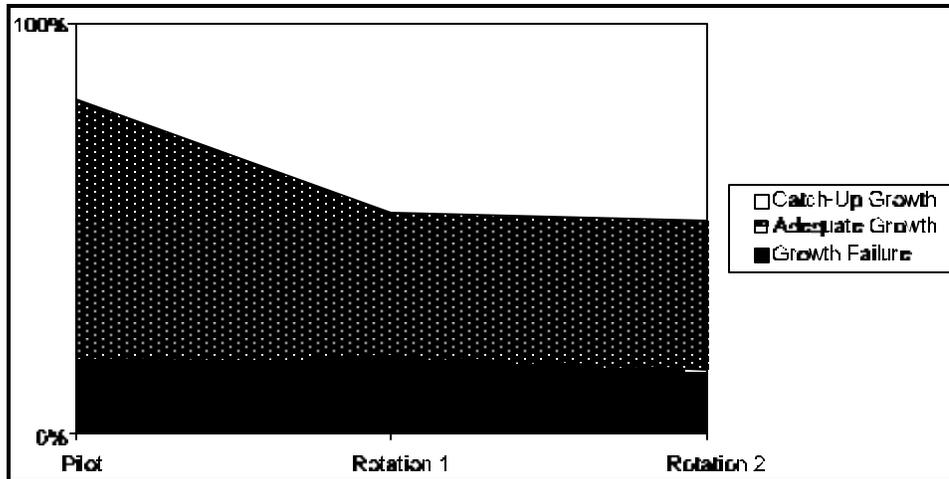
As adjustments were made in the program, the percentage of children having catch-up growth increased, while the number having adequate growth decreased by approximately the same percentage (Figure 6-1). However, the percentage of children showing growth failure remained level. This may again indicate that underlying illness or poverty among severely malnourished children prevents the SK program from rehabilitating this category of malnourished children. Further study is needed to determine the actual cause and to rule out seasonality and its effect on the availability of food.

Figures 6-2 and 6-3 show that overall malnutrition has decreased from 37.6% before SK was initiated in July 1995 to 33.4% in the period from December 1995 through January 1996, with severe malnutrition decreasing from 6.9% to 3.7%. The rate of mild to moderate malnutrition changed less, but peaked from October through November throughout the project area before the initiation of SK as well as after the project ended. SK may have helped to decrease the overall malnutrition rates in the project area, but further analysis of the data is needed, given the actual percentage of all malnourished children reached by the program.

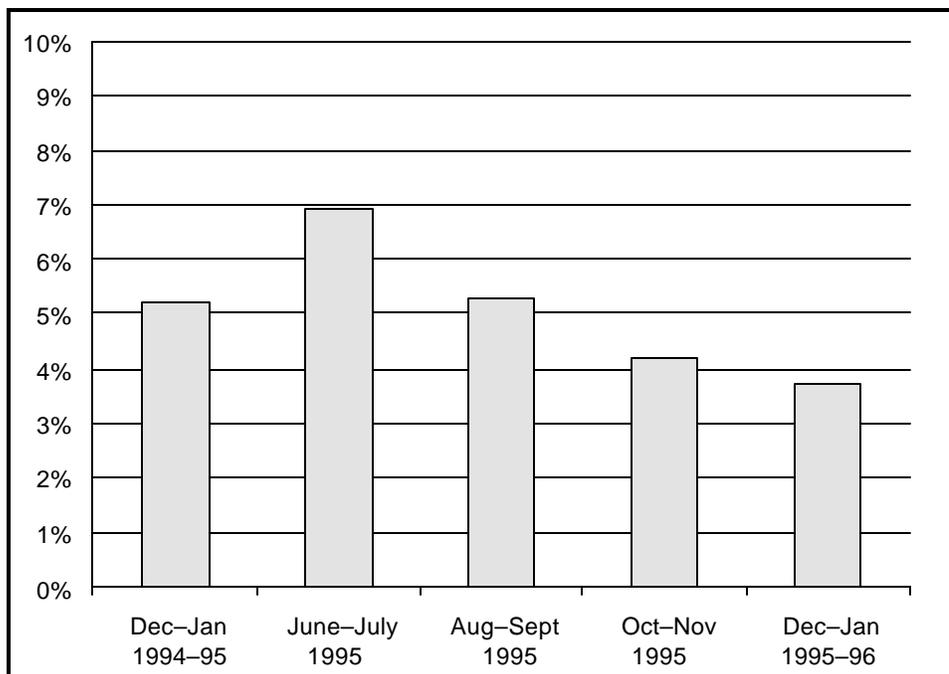
## Hearth Model

Over the past four years, data from the Helen Keller Nutritional Surveillance Project in Bangladesh have shown that the rate of wasting in children aged 6 to 9 months was lowest from June

**Figure 6-1.**  
*Shishu Kabar Effectiveness Over Time at One-Month Follow-Up Weighing*



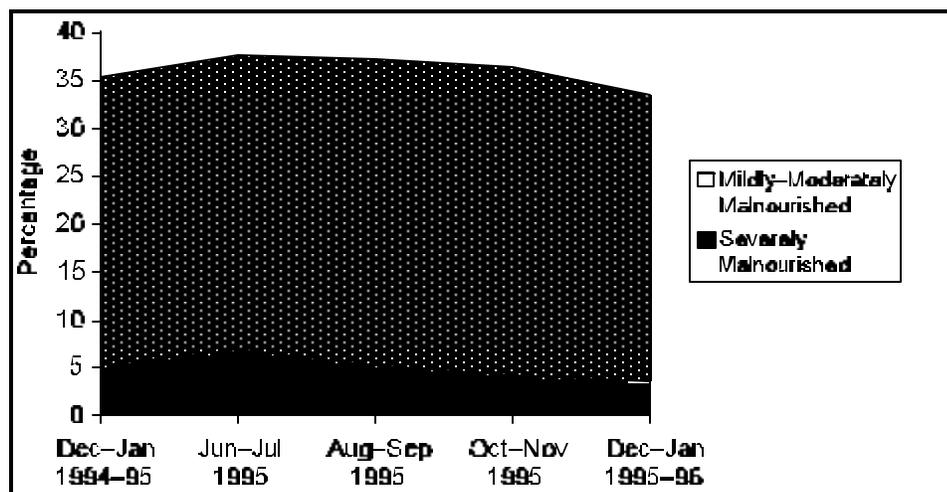
through October, a period when food is more available and less costly, and highest from December through February, when these factors are not operative (Helen Keller International



Institute of Public Health Nutrition 1994). To assess whether the SK program had any impact on malnutrition rates of U2 children, these data would have to be compared to the rates of malnutrition from previ-

**Figure 6-2.**  
*Prevalence of Severe Malnutrition Over Time in Project Area*

**Figure 6-3.**  
*Percentage of Mildly–Moderately and Severely Malnourished Children Over Time in Project Area*



ous years, or from adjacent comparison communities. Until this can be done, the data are inconclusive in showing SK's impact on the rates of malnutrition.

## Lessons Learned

- Since mothers felt that the SK sessions took too much time away from housework, they were asked to cook dhal (lentils) and rice at home before coming to the feeding sessions each day, because these take the longest time to cook and everyone knows how to make them. This had a positive effect on attendance.
- Mothers who had difficulty remembering the health messages were usually the ones not involved in cooking during the SK session. The volunteer mother should involve the other mothers in cooking. This can be done by rotating child care at the session among the mothers to allow each one time to practice cooking. The health messages should be repeated at each session and the question-and-answer format should be used daily to reinforce the mothers' knowledge about ingredients, benefits of various foods and frequency of daily meals.
- More catch-up growth was seen in sessions where mothers were involved in cooking during the session and where the education given by the volunteer mothers was

participatory in nature and included question-and-answer and discussion of the food groups.

- It is important that intelligent and caring volunteer mothers are selected. If this is not possible, the SK trainer should fill in any gaps in the training of the mothers to ensure that the impact of the program is not compromised.
- When training is given daily in a participatory manner, the mothers are able to learn the ingredients, the reasons why each type of food is good for their children and how often to feed the child, regardless of their level of education.
- Mothers who try to send others to receive the food and do not attend the sessions should not be permitted to attend the sessions at all to avoid setting an unhealthy precedent. This completely defeats the purpose of SK, which is to change the feeding habits of the mothers so they will practice the new behaviors in their homes. The fact that mothers who do not attend may not take the food home or send others in their place should be explained carefully during the community meeting before children are enrolled in the program.
- Older children or normal children who come to the session and want to eat should be fed only after the malnourished children have finished. In the cultural context of Bangladesh, it is better to feed them the leftover food than nothing. Giving them nothing when there are leftovers would be considered rude and would give the program a bad name.
- Often malnourished children will not eat much at the first few sessions since it takes several days for their bodies to adjust to high-calorie, nutritious food. If the mothers continue to encourage feeding at each session and throughout the day, the children will soon regain their appetite.
- Children who are unwilling or unable to eat the meals often have had too many snacks. It is important to give them only one snack to stimulate hunger. Sometimes it is the taste of the food to which they may be reacting. We found that using fewer chilies and/or adding sugar often made the food more palatable.
- Any child who has finished his or her portion of food should be given more, until she or he does not want to eat anymore.
- During the rainy season it is sometimes difficult to recruit volunteer mothers if travel to the session is involved. The SK trainers solved this problem by splitting the training sessions into a morning and afternoon session for two to four volunteer mothers. Thus, the training sessions could be held closer to the mothers' homes. Mothers were then more willing to be volunteers.
- To address both the difficulty of illiterate volunteer mothers in conducting the 24-hour diet recall of mothers of normal children as well as restrictions on mothers' mobility due to the observance of *pardah* (sequestering of women), the mothers of the normal children were asked to come to one day of the training sessions to be interviewed by the

participating mothers with the help of the trainer. This helped to mitigate the resistance from husbands and families.

- To improve the reputation of the program and to make it easier to recruit volunteers, it is helpful to give a thank you gift in-kind to the volunteer mothers upon completion of their sessions.
- It is necessary that the SK coordinator supervise both the training of volunteer mothers and the actual SK sessions to ensure that adequate training is given and that all steps are followed during the sessions.
- Many mothers in Bangladesh do not like to have their children weighed or measured, because they believe that it may frighten the children and make them cry, which will make them ill. This was initially a major problem as some women would not allow the follow-up weighing, and the mother would then not be able to see how her child had improved—and would not be motivated to continue. This also made it difficult for project staff to ascertain the impact of the program. Therefore, the agreement of the mother to have the follow-up weighings was included as a commitment needed at the community meeting before the child could be enrolled in the program.
- Children respond better to trainers or supervisors who are gentle while measuring them. This is an important factor. Care should be taken to avoid alienating the families and thus creating opposition to the program.
- In some communities, conservative Muslims and Hindus may not want to have a session together, because of dietary sensitivities based on religious beliefs. The same sensitivity may exist among Hindus of different castes. In this case, we found it necessary to train enough volunteer mothers to have separate groups for each caste.
- It is difficult to add calories to the diet by increasing the amount of oil in the cooking, since poor people cannot afford to buy oil. Peanuts, when crushed into children's food, were acceptable to both mothers and children. Peanuts, which are high in both calories and protein, as well as readily available and inexpensive, were an excellent solution.
- Sometimes a mother may blame the program for her child's episode of diarrhea occurring during the course of the SK sessions. The incidence requires special attention to the child and mother. The trainer should explain the probable cause(s) of the diarrhea and, if necessary, help the mother modify the foods to avoid excessive use of oil, which can aggravate gastroenteritis. The emphasis should be on feeding small amounts of food throughout the day.
- A child with diarrhea at the session also provides the opportunity to teach the mothers present about oral rehydration solution (ORS). Packets of ORS should be present at every session and their use demonstrated when a child at the session is suffering from diarrhea.
- When positive-deviants are selected by the community to be volunteer mothers, they are easier to train because they are often more interested in health. They also make good role

models for the participating mothers. In our experience, when positive-deviant mothers were also volunteer mothers, we generally saw good results in the follow-up weighings.

- Additional follow-up visits by the trainers or community health workers are needed for severely malnourished children, both to identify economic or other family problems and to encourage the mother to continue practicing what she has learned in the sessions. Such visits greatly decreased the number of growth failures of severely malnourished children. During the pilot test, about 21% of these children showed failure on the first follow-up and 14% on the second follow-up weighing, while later in the program, the numbers had decreased to 16% in the first follow-up and 4% in the second one.
- If the potential benefits of the SK program are not explained to the fathers when the children are enrolled during the community meeting or before the start of the SK sessions, they will sometimes become barriers to the participation and/or attendance of the mothers and children. It is possible even at a later point in the session, if a father has become a deterrent to the mother's attendance, for the SK trainer (or, in some cases, a male supervisor from the CSP) to discuss the benefits of the program with him. More often than not, he can be gently persuaded to support the program. Involving the fathers is also key to the sustainability of the program, since they are the ones who will purchase the child's food after the SK sessions have ended.
- Mothers of well-nourished children did not feel bad about being excluded from the program when it was explained to them at the community meeting that it was the whole community's responsibility to rehabilitate the malnourished children and that the project is most effective when used in this way. Also, explaining that their input is important to the success of the program makes them feel honored.
- It was observed that variations among SK trainers accounted for differences in the program results. Some trainers consistently had fewer dropouts and greater percentages of children showing catch-up growth.
- The SK program seemed to influence more mothers to become involved in the overall child survival program, especially growth monitoring. They credited the program for addressing the issue of their children's malnutrition directly and effectively.
- Some conservative Muslim communities did not want to participate in the program because CSS was the implementing agency. They were afraid that the program's objective was proselytizing rather than alleviation of malnutrition. Having a male Muslim staff member in a high position meet with the religious leaders and fathers in the community to explain the program helped in allaying these fears and convincing some of the communities to participate. Care should always be taken to respect the religious sensibilities of the people.

## Unresolved Issues

- The mothers believe that when a child cries and is frightened during weight or length measurements, it will cause the child to become ill. Although the mothers' commitment to attend the follow-up weighing sessions is a prerequisite for participation, it is not a guarantee of attendance. This could be a major problem for the child survival program as a whole.
- Children whose mothers are day laborers cannot be included in the sessions, since the mothers cannot attend. This means that some malnourished children do not receive the help they need.

## Recommendations

- Currently, the SK program only includes malnourished children and a few who are well-nourished. However, children who are classified as normal on their growth cards but whose growth falters after the program ends fall through the cracks. These children should also be included in SK. This will have a positive impact on the success of the program, because such children are the best candidates for rehabilitation. For instance, some of the malnourished children are past the point of being rehabilitated to normal and are permanently stunted. Some are growing adequately and will not show catch-up. Currently, such children are included in the SK program, but even with the best of feedings, they will not show much improvement. The CSP staff may want to look into adjusting the SK program's focus to incorporate those children who are in the normal category on the growth chart, but whose growth is faltering, so as to prevent them from becoming malnourished in the first place.
- Since rates of normal growth change as a child ages, the project may want to revisit how catch-up growth, adequate growth and growth failure are defined for research purposes. However, for project purposes it is probably best to keep these definitions as simple as possible. The level of weight gain required in the two months before the second follow-up weighing should be increased to 400g.
- The project should look into the possibility of obtaining the step-on scales, now being endorsed by UNICEF, that tare (return to zero) when the mother is already standing on the scale so that when the child is put into her arms only the child's weight shows. These would be easier to use for less educated health workers, the child would not become frightened and mothers would more willingly participate in the SK and other WRS programs. UNICEF has asked that our project test a few of these scales for it, since the Ministry of Health is not yet endorsing them. These scales could probably be provided free of charge for the SK program. However, consideration of cost may deter the larger WRS program from buying them, because Salter scales have already been purchased.
- The project should discontinue measuring the height of all children newly enrolled in SK except when necessary for research purposes. The difficulty of obtaining accurate height measurements, the time it takes the SK coordinator to collect these measurements and the constraint it produces to working in the communities are a hindrance both to the

acceptance of the SK program and the larger WRS program. These measurements, since follow-ups are not made until much later, are seen by both the communities and project staff as having no benefit for them, but taken only to appease outsiders.

- The SK program needs to find a way to include children of mothers who are day laborers, possibly by allowing the caretaker in the family to attend the session. However, it needs to be done in a way that does not allow mothers who are not day laborers to miss the sessions.
- A feedback system, involving not only mothers but the entire community, needs to be developed.
- Regular feedback of the impact of SK should be given to the Ministry of Health's Thana Health Complexes as well as the Khulna Civil Surgeon, so they can see that SK is less costly and more effective than hospital feeding centers. Project staff should work with the ministry to promote a more proactive approach to alleviating malnutrition through such models as SK.
- Indicators to study the long-term impact of this program should be developed by experts in the field of epidemiology through dialogue with field staff. Some possible areas of research could include follow-up control studies of children at six months and one year after they have graduated from SK to assess sustainability, impact on younger siblings, community effects and the knowledge of primiparae women.
- The reasons why more female children did not complete Shishu Kabar need to be researched and solutions implemented.
- SK/HIS needs to be incorporated into the overall CSP's health information system. Reporting formats at the union and central office levels should include information from SK and should also be fed back to the ministry. An SK monthly reporting format should be developed for the SK coordinator to report to the CSP director.
- Opportunities whereby the coordinator can be further trained in aspects of nutrition so that she can be a better resource for the SK trainers should be sought out. She should attend at least one such training or workshop per year.
- Efforts need to be made to extend the GMP coverage to more children than at present.
- The project staff should develop some strategies to reduce the dropout rates at follow-up weighings.

## Conclusion

The Hearth nutrition model seems to be providing appropriate and sustainable solutions to childhood malnutrition in developing countries. The initial results of the Shishu Kabar program look very promising and suggested revisions of the program may lead to even better results. Further

research is needed to determine the long-term impact of this project and other applications of the Hearth model. The findings and lessons learned should be shared widely.

### Annex 6-A. Twenty-Four Hour Diet Recall

The chart is a 24-hour diet recall form. The header features a timeline with three mosque icons and a sun. The first mosque is at 8:00 (ଠିକା), the second at 12:00 (ଘଣ୍ଟିକା), and the third at 6:00 (ଶାଞ୍ଜିକା). A crescent moon is shown at 12:00 (ମାସିକା ୧୨:୦୦). Below the header is a 6x5 grid. The rows are labeled with icons: a person, a plate of food, ingredients (onion, garlic, leaf, chicken), a bottle, a jar, and fruit (apple, banana, grapes).

	8:00	12:00	6:00	12:00	

## Annex 6-B. Basic SK Menus

### #1: Kitchuri

SK Trainer Name \_\_\_\_\_

Union \_\_\_\_\_

Volunteer Mother \_\_\_\_\_

Village \_\_\_\_\_

Ingredient Number	Food	Home Measurement	Quantity in Grams	Cost in Taka	Calories per 100 Grams	Actual Calories	Protein per 100 Grams	Actual Grams Protein
1	Rice	2 fists	80.0	1.12	356	284.80	6.4	5.12
2	Dahl (Mushir)	1 full fist	25.0	.85	343	85.75	25.1	6.28
3	Oil	2 tbs/5 children	4.0 / child	.21	900	36.00		
4	Onion	2 onions	8.0	.11	50	4.00	1.2	.10
5	Garlic	2 cloves	.5	.02	145	0.73	6.3	.03
6	Chili	1 whole	.75	.02	103	0.77	1.6	.01
7	Mishti cumra	2 pieces	27.0	.10	30	8.10	1.4	.38
8	Pui shak	5 leaves	20.0	.06	41	8.20	1.9	.38
9	Turmeric	2 finger pinches	.1	.35	349	3.49	6.3	.06
10	Salt	to taste		.01				
11	Peanuts (in curry)	20 peanuts	20.0	.40	655	131.00	20.8	4.16
12	Gur	1 big tbs	40.0	.72	353	141.20	1.5	.60
13	Peanuts (snack)	15 peanuts	15.0	.24	655	98.25	20.8	3.12
<b>Total</b>				4.21		802.29		20.24

## Annex 6-B. Basic SK Menus (cont.)

### #2: Kitchuri with Egg

SK Trainer Name \_\_\_\_\_

Union \_\_\_\_\_

Volunteer Mother \_\_\_\_\_

Village \_\_\_\_\_

Ingredient Number	Food	Home Measurement	Quantity in Grams	Cost in Taka	Calories per 100 Grams	Actual Calories	Protein per 100 Grams	Actual Grams Protein
1	Uncooked rice	2 fists		1.12	356	284.80	6.4	5.12
2	Dahl	1 full fist	25.0	.85	343	85.75	25.1	6.28
3	Oil	2 tbs/5 children	5.0	.28	900	45.00		
4	Onion	2	8.0	.11	50	4.00	1.2	.10
5	Garlic	2 cloves	.5	.02	145	0.73	6.3	.03
6	Chili	1 whole	.75	.02	103	0.77	1.6	.01
7	Egg	1	55.0	3.00	173	95.15	13.3	7.32
8	Potato	2	95.0	.55	97	92.15	1.6	1.52
9	Gur	2 tbs	18.0	.35	353	63.54	1.5	.27
10	Data shak	5 leaves	18.0	.05	22	3.96	1.8	.32
11	Turmeric	1 finger pinch	.5	.18	349	1.74	6.3	.03
12	Salt	to taste		.01				
13	Peanuts	10 peanuts	10.0	.20	655	65.50	20.8	2.08
<b>Total</b>				6.74		743.09		23.08

Note: When eggs are available in the home, the approximate cost of the meal will be only 3.74 taka.

## Annex 6-B. Basic SK Menus (cont.)

### #3: Fish and Vegetable Meal

SK Trainer Name \_\_\_\_\_

Union \_\_\_\_\_

Volunteer Mother \_\_\_\_\_

Village \_\_\_\_\_

Ingredient Number	Food	Home Measurement	Quantity in Grams	Cost in Taka	Calories per 100 Grams	Actual Calories	Protein per 100 Grams	Actual Grams Protein
1	Uncooked rice	2 fists	80.0	1.12	356	284.80	6.4	5.12
2	Dahl	1 full fist	25.0	.85	343	85.75	25.1	6.28
3	Oil	2 tbs/5 children	5.0	.28	900	45.00		
4	Onion	2	8.0	.11	50	4.00	1.2	.10
5	Garlic	2 cloves	.5	.02	145	0.73	6.3	.03
6	Chili	1 whole	.75	.02	103	0.77	1.6	.01
7	Tilapia fish	1	40.0	1.40	156	62.40	14.8	5.92
8	Potato	2	95.0	.55	97	92.15	1.6	1.52
9	Turmeric	1 finger pinch	.5	.18	349	1.74	6.3	.03
10	Salt	to taste		.01				
11	Coconut	1 tbs	10.0	.24	662	66.20	6.6	.66
12	Gur	2 tbs	18.0	.35	353	63.54	1.5	.27
<b>Total</b>				6.74		743.09		23.08

Note: When tilapia fish is available in family ponds, the cost of this meal is 3.66 taka.

## Annex 6-C. SK Supervisory Checklist

### SK Supervisory Checklist

Christain Service Society Child Survival Program,

Khulna, Bangladesh

Date \_\_\_\_\_

Union \_\_\_\_\_

Shishu Kabar Trainer \_\_\_\_\_

Village \_\_\_\_\_

Volunteer Mother \_\_\_\_\_

Group # \_\_\_\_\_

- |     |    |  |
|-----|----|--|
| YES | NO | Did the volunteer mother set out sufficient mats for the mothers and children?   |
| YES | NO | Did the volunteer mother greet the mothers when they arrived at the session?   |
| YES | NO | Did the mothers bring dishes and did the volunteer mother collect the dishes before starting the session?  |
| YES | NO | Did all of the mothers wash their hands and their children's hands and faces before feeding the snack and cooking?   |
| YES | NO | Did the mothers give the children a snack before beginning to cook?  |
| YES | NO | Did the volunteer mother explain what foods would be included in the meal, why they were included and the amounts for each child?  |
| YES | NO | Did the volunteer mother try to involve the other mothers in the cooking of the meal?  |
| YES | NO | When the cooking was finished, did the mothers wash their own hands and the children's before serving the meal?  |
| YES | NO | Did the volunteer mother serve enough of each type of food for each child and hand it to the mother to feed her child?   |
| YES | NO | When the mother did not give her child proper care and attention during feeding, did the volunteer mother encourage the mother to help the child eat and if necessary help the mother to feed the child? |



### Annex 6-D. SK Schematic of One-Month Follow-Up

Weight Gain:	400 Grams or More	200–300 Grams	Less than 200 Grams					
Classify as:	Catch-up Growth (C)	Adequate Growth (A)	Growth Failure (F)					
<b>Action:</b>	Write “C” in second weight position column on malnourished child list. Congratulate the mother, explaining that her child has had catch-up growth, and encourage her to continue feeding the child as she has learned in the SK sessions.	Write “A” in second weight position column on malnourished child list. Congratulate the mother, explaining that her child has had adequate growth, and tell her to continue feeding the child as she has learned in the SK sessions.	Write “A” in second weight position column on malnourished child list. Explain to the mother that her child is not showing sufficient improvement; then ask her if she has been feeding the child as she has learned in the SK session for the past 2 weeks.					
			<b>If Yes</b>	<b>If No</b>				
			Refer child to hospital for treatment of underlying illness.	Ask the mother why she did not practice what she had learned in SK session and write her answer in remarks column. Notify the CHW that there was no improvement from the SK sessions and ask CHW to make a follow-up visit to assess the reason.				
				<table border="1"> <thead> <tr> <th style="text-align: center;"><b>If mother lacks money</b></th> <th style="text-align: center;"><b>If mother has money but failed to practice behavior</b></th> </tr> </thead> <tbody> <tr> <td>Notify CHW to refer mother for CSP loans.</td> <td>Encourage mother to begin practicing behaviors learned in SK session.</td> </tr> </tbody> </table>	<b>If mother lacks money</b>	<b>If mother has money but failed to practice behavior</b>	Notify CHW to refer mother for CSP loans.	Encourage mother to begin practicing behaviors learned in SK session.
<b>If mother lacks money</b>	<b>If mother has money but failed to practice behavior</b>							
Notify CHW to refer mother for CSP loans.	Encourage mother to begin practicing behaviors learned in SK session.							

## Annex 6-D. SK Schematic of Two-Month Follow-Up (cont.)

Weight Gain:	700 Grams or More	200–600 Grams	Less than 200 Grams					
Classify as:	Catch-up Growth (C)	Adequate Growth (A)	Growth Failure (F)					
<b>Action:</b>	Write “C” in second weight position column on malnourished child list. Congratulate the mother, explaining that her child has had catch-up growth, and encourage her to continue feeding the child as she has learned in the SK sessions.	Write “A” in second weight position column on malnourished child list. Congratulate the mother, explaining that her child has had adequate growth, and tell her to continue feeding the child as she has learned in the SK sessions.	Write “A” in second weight position column on malnourished child list. Explain to the mother that her child is not showing sufficient improvement; then ask her if she has been feeding the child as she has learned in the SK session for the past 2 weeks.					
			<b>If Yes</b>	<b>If No</b>				
			Refer child to hospital for treatment of underlying illness.	Ask the mother why she did not practice what she had learned in SK session and write her answer in remarks column. Notify the CHW that there was no improvement from the SK sessions and ask CHW to make a follow-up visit to assess the reason.				
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## Appendix. Three Applications of the Hearth Nutrition Model: Similarities and Differences

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
1. Objectives of Programs	<p>Immediately rehabilitate moderately to severely malnourished 1- to 4-year-olds.</p> <p>Decrease prevalence of malnutrition.</p> <p>In the long term, maintain decreased prevalence of malnutrition.</p> <p>Create network of volunteer mothers to help with other public health interventions.</p>	<p>Immediately rehabilitate seriously malnourished U3s.</p> <p>Decrease prevalence of malnutrition.</p> <p>In the long term, sustain improved nutritional status in the community.</p>	<p>Rehabilitate malnourished U2s in the project area.</p> <p>In the long term, sustain improved nutritional status for preschoolers.</p>
2. Target Group (Vietnam and Bangladesh assume that breastfed infants under 6 months old are not included.)	1- to 4-year-olds and their mothers.	U3s and their mothers.	U2s and their mothers.
3. Population Served	<p>Study area (1993): 1344 enrollees aged 1–4 years.</p> <p>Projected program area (1996): 200,000 total pop.; 9000 enrollees aged 1–4 years.</p>	<p>Study area (1993–95): 80,000 total pop; 1893 enrollees aged under 3 years.</p> <p>Projected program area (1996): 500,000 total population.</p>	<p>Study area (1995–96): 110,000 total pop.; 482 enrollees aged 6–32 months for pilot study and two rotations.</p> <p>Projected program area (1996): 1482 enrollees.</p>

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Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
4. Personnel	<p>Community Health Agents (CHAs). Full-time hospital employees, mostly male. General duties include promoting public health in two or three communities, such as hygiene/sanitation—not much MCH.</p> <p>Nutrition Educators (NEs): 14 full-time. Hospital’s public health dept. employees, all female. All with eighth grade education plus specialized professional training. Full-time implementors of Hearth program.</p> <p>Volunteer Mothers (VMs): Approx. 1800 in district served by hospital, 10–20/community, each serving about 15 families with young children. No financial compensation.</p>	<p>Community Health Workers (CHWs): Five paid health system employees to train and supervise commune health volunteers.</p> <p>Community Health Volunteers (CHVs): One or more for each hamlet selected from women’s union. Received extensive professional training (and review over two years) plus small stipend; later paid through commune endowment fund in perpetuity. One CHV for 80–100 families.</p>	<p>SK Coordinator: One full-time, paid female with a baccalaureate degree, to coordinate and supervise other trainers.</p> <p>SK Trainers: Five full-time, paid female trainers to train VMs and coordinate and supervise feeding sessions in assigned communities.</p> <p>VMs: One in each village (approximately eight per trainer) to in turn train 3–7 other VMs and conduct feeding sessions. No financial compensation, but in-kind incentives.</p>

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
5. Program Components	<p>District hospital (HAS) public health dept.</p> <p>Selection and training of NEs and community agents.</p> <p>Community involvement (theater-in-the-open).</p> <p>Selection of VMs.</p> <p>Selection of eligible families.</p> <p>One-week training of VMs.</p> <p>Identification and diet recall interviews of positive-deviant mothers; menu design.</p> <p>Deworming, weighing, feeding, referral to hospital.</p> <p>Marketplace; purchase of food with program money.</p> <p>One daily meal for 12 days.</p> <p>Follow-up weighings.</p> <p>In context of micronutrient supplementation, EPI, GMP and income generation.</p> <p>Jump-start "network" of VMs as community health workers (breastfeeding, AIDS and STD prevention).</p> <p>Microenterprise lending.</p> <p>Adult learning model: Learning by discovery and doing.</p>	<p>NERP in context of wider PANP.</p> <p>Government support (Ministry of Health).</p> <p>Prevailing commune structure.</p> <p>Census-based registration of population, rosters of all U3s.</p> <p>Positive-deviant approach: diet recall interviews; menu design.</p> <p>Deworming, weighing, feeding, referral to commune health services.</p> <p>Abundance of positive-deviant foods for the taking.</p> <p>One daily meal for 12 days through NERP.</p> <p>Follow-up weighings.</p> <p>In context of micronutrient supplementation, EPI, GMP and income generation.</p> <p>Some private sector funding.</p> <p>Positive community effect through strong community involvement.</p> <p>Adult learning model: Learning by discovery and doing.</p> <p>Microenterprise Lending: Nutrition Revolving Loan Fund (NRLF).</p>	<p>SK in context of wider child survival program (WRC/CSS).</p> <p>Identification and training of trainers.</p> <p>Selection of VMs through community meetings.</p> <p>Identification of malnourished and well-nourished children through HIS.</p> <p>Deworming, weighing, feeding, referral to district health services.</p> <p>Community participation in selection of VMs, a kitchen in the community for cooking and feeding sessions and a volunteer male to purchase food for sessions.</p> <p>Positive-deviant approach: diet recall interviews and focus groups; menu design.</p> <p>One daily meal plus snack for 12 days.</p> <p>Follow-up weighings.</p> <p>In context of micronutrient supplementation, EPI, GMP and income generation.</p> <p>Health Information System linkage.</p> <p>Adult learning model: Learning by discovery and doing.</p> <p>Microenterprise lending through CSP.</p>

## Hearth Model

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
<p>6. Characteristics of Feeding Component</p>	<p>Include children aged 12–59 months plus a few under 12 months.            Include all moderately and severely underweight plus many mildly malnourished.            Positive-deviant mothers defined as mothers of children 1–4 years who are normal or mildly underweight, living in local community but without regard to economic status of family. Community economic status homogeneous.            NEs and VMs together identify positive-deviant mothers, do a food frequency study of them and derive a positive-deviant menu from it for the community.            The same positive-deviant menu was obtained in all of the communities, namely a mixture of bean sauce, grain (rice or corn) and vegetables.            Positive-deviant menu is a vital selling point to the mothers because it convinces them they too can afford it.            The feeding sessions include 2–6 children.            Feedings are once a day in the morning for 12 days.            No price of admission to the feeding sessions.</p>	<p>Include U3s.            Include severely and very severely malnourished children.            Positive deviance study conducted by small trained team of hamlet representatives who used the epidemiologic 2x2 table to identify mothers whose children were well nourished despite family poverty.            Observations from the study formed the basis for community response to the problem, <i>i.e.</i>, nutritious, available, inexpensive or free foods and feeding practices through monthly NERP sessions, which give one daily extra meal to participants for 12 days.            The positive-deviant foods were paddy shellfish and greens—free and abundant.            Mothers/caretakers must bring a handful of positive-deviant foods daily as price of admission.            The NERP meal must be consumed during the session and not taken home.</p>	<p>Include U2s.            Include mildly–moderately and severely malnourished children.            Coordinator and trainers conducted pictorial 24-hour diet recall of positive-deviant mothers.            Tabulated results of study formed the basis for 3 menus using inexpensive, locally available positive-deviant foods, namely rice, lentils and vegetables. Sugar and crushed peanuts were added to these to obtain target of 700 calories and 20–30 grams of protein.            The feeding sessions include 3–7 children.            Feedings are once a day in the morning for 12 days.            No price of admission, but mothers must agree to preset conditions to participate.            Mothers’ attendance as well as participation in cooking and helping their children eat is required.</p>

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
7. Feeding and Deworming Program	Takes place in context of already functioning GMP program with periodic deworming; vitamin A distribution universal; iron distribution to U5s is sporadic (only those who are referred in for severe anemia); EPI.	GMP is established as program commences; national vitamin A distribution program may need boosting depending on commune.	Takes place in context of existing CSS GMP program; vitamin A distribution and periodic deworming are included. Iron supplementation is not universal.
8. Other Program Prerequisites and Inputs	Rosters of selected communities. VMs selected on basis of personality and leadership qualities.	GMP (scales, growth charts, trained village-level personnel). Price of admission to feeding sessions. Immunization/vitamin A distribution program.	GMP (scales, growth charts, trained personnel). At least one trainer per union. Mothers must agree to: (1) continue feeding normal meals at home besides SK feedings; (2) continue feedings at home after completion of program; and (3) allow weighing and measuring on first day of sessions as well as follow-up weighings.
9. Link to Income Generation	Targets mothers of children who fail to show growth at one-year follow-up.	Targets neediest families with malnourished children.	Targets mothers of children who fail to grow after 8 weeks.
10. Estimate of Costs and Basis	\$7 per participating child (includes trainer salary, transport, food and supervisory time). Note: Each child spends only two weeks in the foyer and is not allowed to repeat; instead he/she is referred to the health care system and/or the microenterprise lending program.	\$3.92 per rehabilitated child including CHW (in perpetuity), seed money for revolving fund, refurbishing health center (one-time cost), retraining health center staff.	\$14,000 per year for 6 paid staff, food and fuel, and incentives for volunteer mothers and trainers.
11. Source of Funding	Private (Hôpital Albert Schweitzer).	Government support plus some private sector funding.	World Relief, USAID.

**Hearth Model**

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
12. Situation Analysis	<p>Generally abysmal social indicators. Political and economic turmoil and instability.</p> <p>Minimal community cohesiveness or solidarity.</p> <p>Extremely demanding lifestyle of rural Haitian women, who are more likely to be single parents and wage earners.</p> <p>Low literacy.</p> <p>Men conspicuous by their absence.</p> <p>Rural, agrarian.</p>	<p>Organized society.</p> <p>Target driven.</p> <p>Relatively better social indicators; higher literacy.</p> <p>Strong political infrastructure at local and national levels, including a national health policy to eradicate malnutrition.</p> <p>Strong existing community-based commune structure with volunteers workers.</p> <p>Rural, agrarian (rice-growing).</p>	<p>Male-dominated society.</p> <p>Very poor but improving.</p> <p>Strong seasonal impact—yearly floods and devastation.</p> <p>Environmental issues.</p> <p>Politically chaotic, unstable.</p> <p>Endemic disease patterns.</p> <p>Poor availability of and access to health care facilities.</p> <p>Generally supportive neighborhood and local institutions; occasionally censorious.</p> <p>Strong family structure, mothers stay with children. Women socially and economically dependent, and not often single parents or wage earners. Mothers-in-law dominant in communal family settings.</p> <p>Breastfeeding at high levels up through age 2 years, but gender inequalities pertain (males fed more).</p>

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
13. Role of Government	Not yet integrated into government health services. Government is informed of activities.	Partnership with Ministry of Health (MOH), which provides: Interface with SCF on refurbishing health centers and retraining. Norms and standards. Immunizations, growth charts, vitamin A supplementation, EPI. One medical officer per commune. Training for personnel. Endorsement for program.	Local health officers approve service, but not yet integrated into government health services; however, there is reciprocal sharing of information.
14. Process Monitoring	Eight-week weighing and referral to hospital of children who did not grow. VMs continue to be in informal contact with mothers of rehabilitated children and with other VMs. Agents are in informal contact with VMs in their communities. NEs in periodic contact with VMs as new programs are implemented.	Peoples' committee and hamlet leaders supervise NERP, make scatter graphs and record weights to show results. District steering committee supervises growth monitoring activities. Commune-level involvement. SCF clerical and supervisory personnel collect data, enter on computer, recalculate categories and give feedback to communities. SCF personnel assist and supervise use of "scatter graphs," using national growth chart, so that each hamlet makes a "pie chart" on nutritional status periodically.	Weekly staff meetings of SK coordinator and trainers for problem-solving and refresher training. Monthly meetings for new training such as breastfeeding, feeding a child who has diarrhea. Chain of supervision and feedback from top to bottom. Grading system for trainers and VMs (checklists and scores).

**Hearth Model**

Indicators	Haiti Hearths	Vietnam NERP	Bangladesh SK
15. Outcomes	Preliminary results showed significant contribution toward solving malnutrition, especially by preventing deterioration of mildly malnourished children, but did worse than comparison group with respect to severely malnourished children (this negative finding was NS). Jump-started network of motivated health volunteers.	Preliminary results showed a 40% reduction in overall malnutrition as defined by government growth chart (children weigh less than 2 SDs below international median); and 68% in severe malnutrition (child weighing less than 3 SDs below international median).	Preliminary analysis of follow-up weighings after 4 months of SK sessions showed significant impact: 85% of the participants had catch-up or adequate growth when weighed one month after completing the sessions. The figure went up to 90% at the two-month follow-up weighing. However, the results are inconclusive and further study is required.

# Meeting Participants and Contributors

## Meeting Participants

**Sabir Ahmed, MD**, is currently mentoring the project adviser of the Christian Service Society's child survival project in Bangladesh—a position he had held himself in the past. He also serves as medical officer in the civil surgeon's office in Khulna. Previous positions have included medical officer and assistant surgeon in the Ministry of Health and Family Planning.

**Gretchen G. Berggren, MD, MSc Hyg**, is an international consultant in maternal and child health, nutrition and family planning. She began her career as a medical missionary in Zaire and later went on to Tunisia. Until her recent assignment in Haiti for Hôpital Albert Schweitzer, she was on the faculty of the Harvard School of Public Health, Department of Population Sciences. Her experience in nutrition includes consultancies with UNICEF, Save the Children Foundation, CARE and World Relief Corporation in Latin America, Asia and Africa. She initiated a special project, "Home and Village Prepared Weaning Foods," for Harvard/MIT under the chairmanship of Dr. Nevin S. Scrimshaw. Currently she is a fellow of the Georgetown University Institute of Reproductive Health and a visiting lecturer at Tulane University School of Public Health. She has a special research interest in information systems for census-based, community-oriented primary health care programs.

**Warren L. Berggren, MD**, is the director of the child survival program at the World Relief Corporation. Most recently, he was the director of maternal and child health at the Hôpital Albert Schweitzer in Haiti where he supervised the nutritional rehabilitation of more than 8,000 children in Hearths operated by the hospital. Previous positions include director of Save the Children's international primary health care program, senior health scientist with the University Research Corporation, associate professor of tropical public health and population sciences at the Harvard School of Public Health. He has also served as medical missionary with the Evangelical Free Church of America in the country now known as Zaire. With his wife Gretchen, he developed the Hearth nutrition model from its precursor, the Nutritional Education and Rehabilitation Center, in Haiti, and participated in its adaptation to projects in Vietnam and Bangladesh.

**Arne Bergstrom** is the regional director for Asia at the World Relief Corporation and is responsible for program management of WRC projects in Bangladesh, Cambodia, India and Pakistan since 1992. In 1996 he also assumed responsibility as the director for disaster response. Previous experience includes 10 years of leadership positions for World Vision in various field offices around the world, including the Philippines, Papua New Guinea and the Sudan. He has also served as a senior executive assistant for Asia and the Middle East at World Vision's international headquarters.

**Barton R. Burkhalter, PhD**, is a technical officer for the BASICS Project, where he heads the PVO small grants and support program. Previous positions include senior program officer for the Academy for Educational Development, where he co-developed the PROFILES nutrition advocacy model, director of the Center for International Health Information, associate director of Wellstart, editor of *Nutrition Planning*, president of Community Systems Foundation, research

professor of Family and Community Medicine at the University of Arizona and adjunct professor of Urban and Regional Planning at the University of Michigan. He has worked and published extensively in health and nutrition in developing areas.

**Lisa Filoramo, MSPH**, is a public health consultant. Past experience includes assisting Dr. Muriel Elmer in providing technical support and management of the World Relief Corporation's child survival projects in Bangladesh, El Salvador, Honduras and Nicaragua for three years. She also coordinated the initiation of the Hearth program in Bangladesh, including the recruitment of Hearth trainers, adapting Hearth curriculum, training and supervising Hearth trainers as well as training a Bangladeshi Hearth coordinator to replace her before she left the country.

**Erin Keeley** has been the child survival secretary at the World Relief Corporation since February 1996. Her previous experience includes proofreading and copyediting for various publishing companies in the Chicago area. She has a bachelor of arts degree in English writing, with a minor in mass communications from Taylor University in Upland, Indiana.

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**Henry Menager, MD**, is a community health specialist. He has worked with Save the Children and Hôpital Albert Schweitzer in the implementation of grass roots nutrition programs. He received his MPH with a concentration in epidemiology from the University of Illinois in 1997.

**Mark Munshi** is the country director for Christian Service Society, Bangladesh. He received a bachelor of science degree in business administration with a minor in church ministry from Southwestern Assemblies of God University, Waxahachie, Texas. He has served as a pastor for Afil Church, a youth pastor for Khulna Assemblies of God Church, the national youth president for Bangladesh Assemblies of God Youth Movement, the international student president and vice president for the Student Ministerial Alliance for God, Jacksonville College, Jacksonville, Texas.

**Howard Searle, MD**, is currently serving on the Board of Reference at the World Relief Corporation and practicing medicine in Bloomingdale, IL. He is the former director of the child survival program at the World Relief Corporation, where he served from 1987 to 1990. His previous experience also includes 14 years of service in medical missions in India and Bangladesh and five years in community health development with MAP International. He earned his MD degree from the University of Western Ontario and his MPH from Johns Hopkins University. He is a fellow of the Royal College of Surgeons, Canada since 1972.

**Olga Wollinka, MSHSE**, is the child survival grants manager at the World Relief Corporation, where she began working in 1994 and by 1995 had joined the full-time staff. She provides management and technical support for projects in Bangladesh, Honduras, El Salvador, Nicaragua and Mozambique. Previously, she had been an instructor in the Health Education Department at the University of Florida for three years.

## Other Authors and Editors

*Naheed Bashir, MA*, is currently doing a consultancy at the BASICS Project as an editorial and publications specialist. Her international development experience includes three years as an IEC consultant in Pakistan, where she did projects in nutrition, primary health care and family planning and breastfeeding promotion for UNICEF, the Government of Pakistan, Wellstart International and a local NGO. She is the former director of publications at the University of California San Francisco. She has a master's degree in English literature from the University of Punjab and one in linguistics from the University of Michigan.

*Robert S. Northrup, MD*, is a technical officer for the BASICS Project, where he is currently working on public-private sector linkages for child survival. He has been the technical director of the PRITECH Project in the past. His extensive international experience includes an assignment as the Rockefeller Foundation's representative to Indonesia. His areas of expertise include diarrheal disease control, primary health care, integrated management of childhood illness, quality management, evaluation and monitoring, health systems planning and medical education and training, among others. He has been on the faculty of the University of Hawaii, the University of Alabama, Brown University, Johns Hopkins University, and Gadjah Mada University in Indonesia. He is a graduate of Harvard Medical School.

*Jerry Sternin, MA*, has 20 years of international development experience as a Peace Corps volunteer and director in Nepal, the Philippines, Rwanda and Mauritania; and as Save the Children director in Bangladesh, the Philippines, Vietnam and Egypt. He holds a master's degree in Asian studies from Harvard University.

*Monique Sternin, MA*, has worked in international development in Bangladesh and Vietnam. She was responsible for creating a child stimulation program at the ICDDR-B in Dhaka, Bangladesh. She has also developed the Nutrition Education Rehabilitation Program (NERP) with her husband, Jerry, in Vietnam. This program reaches more than a half million people. Her professional interest, however, lies in women's reproductive health. She was born and educated in France (Sorbonne) and also holds a master's degree in education from Harvard University.